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Shopper Loyalty Examined

WASHINGTON, D.C. – Shoppers have difficulty reading prices in a supermarket which has eliminated price marking in favor of the Universal Product Code (UPC) and will switch from those stores more often than shoppers in conventional supermarkets, according to a recently released study.

The results of the study, sponsored by the Ad Hoc Committee for the Development of the UPC, prompted the committee to change its position to one favoring retaining price marking of individual items (see accompanying story).

Dr. John W. Allen and Dr. Gilbert D. Harrell of Michigan State University and Dr. Michael D. Hutt of the University of Vermont conducted the study.

The team acquired its data by conducting personal interviews with randomly selected shoppers in pairs of UPC and conventional supermarkets in three different cities.

The shoppers were interviewed over a six-week period in three phases: at the point of purchase decisions, when entering and leaving supermarkets and at their homes by telephone.

In Phase 1, a sample of 720 shoppers (120 from each of the

(Continued on Page 4)

Study Stirs UPC Group to Switch Support to Item Price Marking

By Catherine Arnst
Of the CW Staff

WASHINGTON, D.C. – Customer satisfaction is essential to the livelihood of any merchant, so, when a study found customers are dissatisfied with supermarkets that replace prices with the Universal Product Code (UPC), one supermarket committee did a quick about-face.

The Ad Hoc Committee on the UPC, which sponsored the $75,000 study, recommended that scanner stores follow the traditional approach to individual item marking used in conventional stores after the findings were released recently (see accompanying story).

This position is a considerably modified version of the one taken by the committee when it was formed in 1974. At that time, its position was that, "on the basis of current studies, stores could expect to achieve savings by instituting shelf pricing and/or alternative forms of price information for item pricing. . .the move away from item pricing should not represent significant problems to consumers in their shopping efforts."

Study Tests Consumers

The study that shot that line of reasoning down was devoted to the ease and accuracy with which consumers can read and compare prices. Consumers were tested at the time of selection of an item, the time of checkout and while at home.

"The results indicated that some shoppers in 'prices-off' stores do experience a measurable reduction in price awareness and consciousness compared with shoppers in conventional stores," the Ad Hoc Committee said.

The "savings stores could expect to achieve by instituting shelf pricing and alternative forms of price information" may be meaningless to the consumer who doesn't use those alternative pricing methods, according to the study.

Shelf pricing is often considered to be synonymous with unit pricing, and only 13% of the shoppers surveyed in both UPC and conventional supermarkets used the unit price while shopping.

The detailed cash register tape a customer receives at a UPC store is another alternative method offered.

Only 5.4% of the UPC customers surveyed used cash register tapes to determine prices in the home.

Difficulty Reading Prices

The survey brought out in every phase of its investigations that the shopper in a UPC store has difficulty reading prices and has a higher percentage of error in estimating prices than shoppers in conventional stores.

This difficulty could wipe out any savings the store would accrue through eliminating price marking, because it would affect the customer's desire to continue patronizing that store.

The costliness to the supermarket of consumer dissatisfaction was shown in the survey's probe of store loyalty of shoppers. In telephone interviews, the shopper was asked to identify which store was visited last.

During the first time period, about 43% of the UPC shoppers switched stores compared with about 26% in the conventional store. The same trend was found during a second time period: 47% of the UPC shoppers switched compared with 31% of the conventional shoppers.

"A number of factors impinge on store selection, one of which might be the store pricing system," the study said.

Although the study has shown,

(Continued on Page 4)

DEC Tops Repertoire With 1088

By Esther Surden
Of the CW Staff

MARLBORO, Mass. – Digital Equipment Corp. has added another KL10 processor to the Decsystem-1080 and come up with a dual-processor configuration that is the most powerful in its repertoire.

With the Galaxy Batch software, included with the Decsystem-1088, this configuration is said to offer users both interactive time-sharing and increased batch capabilities.

Along with the 1088, DEC announced a Dual Decsystem-1080 configuration designed to give the user total system redundancy; a data storage disk subsystem which offers "on one spindle twice the storage of the previously available subsystem at a 30% increase in price"; a magnetic tape subsystem for users who do not need high performance; and a software application package for photocomposition, typesetting and word processing, a spokesman said.

The basic Decsystem-1088 configuration includes two KL10 central processors, 256K words of 36-bit memory, a disk system with two 88M-byte drives, a magnetic tape system with 16 tape drives of 320 kHz each, a 32-line communications system, a 1,200 line/min printer and a 1,000 card/min reader. It costs $1,225,540, DEC said.

Processor Features

The KL10 was originally announced in September 1974. Processor features include the use of a 2K 36-bit word cache memory, four-word wide data path between the core and cache and the use of emitter-coupled logic (ECL) circuitry. It runs the Decsystem-10 monitor operating system.

The system uses a PDP-11/40 as a diagnostic and console front end, the spokesman noted.

The Decsystem-1088 offers users considering IBM 370/158 systems a viable alternative at a smaller cost, the spokesman claimed.

IBM, however, said it could not compare the two systems.

Other comparable products include the Burroughs Corp. B6700 series, Control Data Corp. Cyber 72 and 73 and the Univac 1110, the DEC spokesman added.

A key feature of the Decsystem-1088 is what DEC termed "high availability." By duplicating the processor and, in the case

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B&B Now Testing Hybrid Monitor

By Don Leavitt
Of the CW Staff

SUNNYVALE, Calif. – A hybrid monitor system that restructures programs running under SVS releases of IBM's OS/VS2 and reduces their paging rates "significantly" is now in the final stages of testing, according to Michael W. Ayer of Boole & Babbage, Inc. (B&B).

At one user site, Ayer said, such restructured programs – which are stored in their own library for permanent use – have shown improvements in paging ranging from 11% to 83%.

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CDC Cyber 18 Debuts at Interface 76

By Ronald A. Frank
Of the CW Staff

MIAMI BEACH – Control Data Corp. introduced the Cyber 18 family of minicomputer-based systems at the Interface 76 conference here last week.

Three models, the 18-10, 18-20 and 18-30, use semiconductor memories and microprogramming techniques. A fourth model, the 18-17, uses CDC System 17 processors.

On display at the conference exhibition was the 18-10, which CDC said can operate as an intelligent terminal and emulate the IBM 2780 and 3780 terminals.

The system shown included a CPU with 64K bytes of storage, 300 line/min printer, 300 card/min reader and dual 7-track, 800 bit/in. magnetic tape drives.

The system was demonstrated running remote batch jobs on-line to a CDC DP center in Bethesda, Md., which is part of the company's Cybernet communications network, a spokesman said.

The 18-20 was designed for business applications and includes an RPG-II compiler. The 18-30 can operate with CDC Timeshare software and handles up to 64 terminal users in the education area, the company said.

The Cyber 18 systems are controlled by microprograms resident in semiconductor memory which read instructions from main memory and decode them for execution in the microprocessor, CDC said.

The microprograms execute the system instruction set, operate the I/O channels and handle service interrupt and program protect systems.

Up to four parallel operations can be performed in one microinstruction and several microinstructions can be executed during a single 750 nsec main memory cycle, CDC said.

A typical 18-10 system with 32K of storage and 300 card/min reader, 300 line/min printer, common controller, CRT and synchronous communications costs $39,840. An 18-17 system with the same basic units plus magnetic tape and cartridge disk costs $64,715.

An 18-20 system with 65K that adds 1K of microprogram memory, magnetic tape and mass storage costs $85,029. A dual-processor 18-30 with 393K and 4K of microprogram

(Continued on Page 8)

Interface 76 coverage continues on Pages 7 and 8.

FCC to Reconsider Its Definition Of DP/Communications Boundary

By Ronald A. Frank
Of the CW Staff

MIAMI BEACH – The Federal Communications Commission (FCC) will reconsider the questions first raised in its Computer Inquiry "within three months," according to Walter Hinchman, chief of the commission's Common Carrier Bureau.

Speaking at a session on common carrier interconnection policies at Interface 76 here last week, Hinchman said the upcoming proceeding would essentially examine the entire teleprocessing environment to determine which parts are DP and which parts are communications, and it will have to determine the demarcation line between the two.

The commission may initiate an inquiry or it may undertake an inquiry and proposed rule making "if we have definite enough views that we can put out for comments," he said.

The second possibility will depend on the outcome of studies now being done by the Common Carrier Bureau staff, he added.

The staff is interested in receiving comments from users and other interested parties on how

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But Avoids Broad Ruling

High Court Rejects Software Patent

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Thomas R. Johnston has had his day in court – and he lost as the U.S. Supreme Court last week rejected his plea for patent protection on a software-based accounting system [CW, Dec. 17].

The 7-0 decision, written by Associate Justice Thurgood Marshall, said in essence that the system Johnston envisioned simply didn't have enough new ideas to be patentable.

The court avoided, however, a broad ruling on the "general patentability" of computer programs.

Johnston's idea was to help farmers and other small businessmen gain more information from their bank statements. It required the checking-account customer to mark each check and deposit slip to show into which of several special categories it should be grouped.

After that, the bank would add an extra digit to the account number in the Magnetic Ink Character Recognition (Micr) strip along the bottom of the document.

Keyed to the specific digit encoded, the bank's computer could accumulate subtotals which could be printed out on the statement, providing in a limited sense a general ledger for the customer.

Johnston's application was originally turned down by the U.S. Patent Office because, the office ruled, it contained ideas that would have been obvious to anyone skilled in computer programming.

An appeal to the U.S. Court of Customs and Patent Appeals (CCPA), however, was successful and Johnston seemed on his way to getting a patent after all.

The CCPA accepted Johnston's argument that his software program turned what had been a general-purpose computer into a special-purpose "apparatus" which was patentable. It said the Patent Office had been wrong in relying on the 1972 Benson-Tabbot decision of the Supreme Court, which had rejected a patent application on an algorithm which in effect is a "process" and unpatentable.

Argument Change Claimed

The Patent Office brought the Johnston case to the attention of the Supreme Court, contending Johnston had changed the basis of his argument between the time of the original rejection and the appeal to the CCPA. The appeals court was therefore hearing what amounted to a different case, the Patent Office told the Supreme Court.

The high court accepted briefs throughout the fall and heard oral arguments in early December. At that time, Associate Justice William O. Douglas, who wrote the Benson-Tabbot decision, had retired and associate Justice John Paul Stevens had not yet joined the court as his replacement.

Justice Harry Blackmun excused himself from the case. During the oral arguments, justices William H. Rehnquist and Byron R. White asked most of the questions from the bench.

In his decision, Marshall did not go into lengthy comparisons between the Johnston case and the earlier one. He dwelt instead on the provision of the law that prevents an invention from being patented unless it is so markedly different from other inventions in its field as to make it "nonobvious to one reasonably skilled in the art."

The court simply concluded Johnston's process wasn't that different, an industry observer said in summing up the decision.

FCC Reopening Computer Inquiry

(Continued from Page 1)

the boundary between regulated communications services and nonregulated DP should be defined, Hinchman said.

Reviewing current issues before the FCC, Hinchman said there "are widespread concerns" relating to the joint Comsat/Aetna/IBM effort to supply data services via satellites using rooftop antennas.

This proposal from Satellites Business Systems (SBS) raises concerns of antitrust implications from "yet another giant in the telecommunications industry" and related questions regarding "permissible corporate structures." The FCC has not yet made a final decision on the SBS proposal, Hinchman said in a later comment.

As a result of recent equipment certification/registration decisions by the commission, users should be able to purchase or lease all types of registered equipment and connect it directly to the telephone network "by midsummer," Hinchman predicted.

This permissive interconnect policy will protect the phone network from harm while leaving the user free to employ the equipment he needs, he added.

Another speaker, John Scorce, vice-president of Data Transmission Co. (Datran), commented on recent legislation introduced in Congress to blunt the impact of the specialized carriers.

The bill, known as the Consumer Communications Reform Act, would result in "the emasculation of the interconnect industry by returning jurisdiction to the states where the telephone industry has considerable power and influence," Scorce charged.

It would also set up "strictures so severe that no specialized carrier could secure another grant or license," he said.

The proposed bill is based on claims the phone companies have lost revenues to the specialized carriers, Scorce said. But actually the Bell System in 1975 got $120 million in new business from private line services. This "far outstrips the combined revenue of the companies that compete with AT&T," Scorce told attendees.

Special Carriers May Join Forces

The Datran official said the specialized carriers may band together to form an organization to fight the legislation being pushed by the phone companies.

"The specialized carriers will not become the whipping boys for the massive rate increases imposed on this nation by the telephone companies," Scorce said. Datran will "vigorously resist any attempt to turn the clock back and return this industry to its former monopolistic status," he said.

Defending the position of the established carriers was James Naylor, director of settlements for the U.S. Independent Telephone Association. "We in the telephone industry are having considerable difficulty accepting the policymakers' disregard of economic impacts resulting from the new competition in our business," he said.

"Selective competition" from the specialized carriers "will be felt throughout the (current economically integrated) system by the telephone companies and their customers," Naylor warned.

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APPLIED DATA RESEARCH introduces the LOOK System for real-time performance measurement of OS/VS systems (MVT, SVS, and VS1).

LOOK uniquely overcomes critical weaknesses of existing software monitors:

- LOOK provides immediate results via operator console or user terminals (i.e., ROSCOE & TSO).
- LOOK does not encroach upon system resources. It needs only 1/10 of the overhead of comparable systems.
- LOOK is easy to use. Simple to install. It becomes a valuable performance measurement tool immediately.
- LOOK includes facilities to dynamically correct system imbalances which result in reduced throughput.

LOOK COMMANDS

LOOK's immediate-response capabilities are activated by straightforward commands, entered from any operator console. These commands summarize the following system elements:

- CPU Utilization
- I/O Activity
- Paging Activity (VS only)
- Wait Conditions
- Job/Device Associations
- Control Block Information
- Core Usage

Two other LOOK commands permit immediate action to correct system malfunctions. You may dynamically change a job's dispatching priority during execution to eliminate the monopolizing of system resources by high-priority jobs. And you can cancel most jobs not cancellable via the analogous OS or VS cancel command.

Since LOOK is a command, it requires no resources when not being used. Its capabilities are instantly available when you need them. The console display of pertinent data on system performance enables immediate identification of "hidden" problems which cause visible symptoms of poor performance. Like slow turnaround. Frequent system hangs. And sluggish processing. Specific problems which LOOK diagnoses include:

- Channel, Device, or File Contention
- Thrashing and Excessive Paging
- Excessive Arm Movement
- High-Priority, CPU-BOUND Jobs
- Program Loops
- Core Fragmentation
- Exclusive use of data sets
- Waiting for shared DASD
- Lost I/O Interrupts

LOOK offers hardcopy output known as the LOOKLOG. It automatically executes LOOK commands over an extended period of time and documents system performance. This documentation represents a complete "snapshot" of overall performance for detailed, in-depth systems study.

Advantages of LOOK's numerous applications include:

- Instant Information—Pertinent performance data is obtained when it is needed most—when a problem occurs.
- Invisible Problem Identification—"See" hidden aspects of a system's operation which may be the unsuspected problem source.
- Simplicity—LOOK is quickly installed, easily used, and immediately beneficial.
- Validity—LOOK reports totally accurate and realistic data.
- Versatility—LOOK capabilities are valuable to operators, system programmers, schedulers, and management.
- Economy—LOOK is guaranteed to help fine-tune current operations with a maximum return on a minimal investment.

LOOK is currently operational in over 40 sites under MVT, VS1, and VS2, with future availability planned for MVS. LOOK is also operable under TSO in operator mode and ROSCOE (Version 3.3).

JOB	STEP	TOTAL PAGES	LT FIX BLW V=R	LT FIX ABV V=R
PRODJOB1	STEP4	90	00	00
PAGEABLE	LINKPACK	80	00	08
TESTJOB2	STEP1	20	00	00
XJOB	LNK	12	00	00
*NUC 3D	SQA 16	LSQA 8	LRG AVL V=R 30 OF 30	
*PAGES IN/SEC 45	PAGES OUT/SEC 40			

THRASHING DIAGNOSIS

JOB	STEP	% USING CPU	% WAITING FOR CPU	% WAITING FOR I/O OR WORK	PRIORITY
PRODJOB1	STEP3	92%	00%	08%	10
OPERATNG	SYSTEM	06%	00%	94%	15
TESTJOB	STEP1	02%	96%	02%	03
XJOB	COBSTEP	00%	100%	00%	06

*THE CPU IS BUSY 100% OF THE TIME

HIGH-PRIORITY, CPU-BOUNO JOB OIAGNOSIS

CHN/UNIT		TOT BSY	VOL	JOB	STEP	FILE	BSY	CYL	CWT
*CHN	1	32%							
CHN	2	15%							
*DSK	152	50%	DISK03	PRODJOB1	STEP5	INFILE	22%	160	05%
				PRODJOB1	STEP5	OUTFILE	12%		
				TESTJOB2	STEP1	SYSUT3	10%		
				XJOB	GO	LIBFILE	06%		
DSK	233	20%	DISK04	PRODJOB1	STEP5	MASTFILE			
DSK	130	10%	SYSRES	OPERATNG	SYSTEM				02%

OEVICE CONTENTION OIAGNOSIS

SYSOSN	TEST LIB	
*TESTJOB3	STEP1	-OLD
INIT1	PRODJOB2	-SHR
INIT2	TESTJOB4	-SHR
INIT3	PRODJOB3	-SHR
INIT4	YJOB	-SHR

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Study Finds Shoppers Not Loyal to UPC-Only Stores

(Continued from Page 1)

X stores) were interviewed while selecting a product.

Each was asked to give the price of the item selected using any available price markings. Of the 320 UPC shoppers, 88% provided the correct price; 96% of the conventional shoppers provided the correct price.

Only 13% of the shoppers in both types of stores claimed to have used the unit price of an item to determine cost.

Approximately 15% of the UPC shoppers reported difficulty in seeing prices, compared with 9% of the conventional shoppers. When asked whether they had compared the price of the product with another, 21% of the UPC and 32% of the conventional shoppers said they had made such comparisons.

Phase II

For Phase II, 1,500 shoppers were interviewed at the point of checkout to determine differences in price awareness of shoppers, the frequency and levels of price comparisons, the amount of time spent shopping and differences in the reported difficulty in seeing prices.

For products selected by the shopper, those in UPC stores correctly identified the price of 56% of the items, while conventional shoppers correctly identified the price of 71% of the items.

When the interviewer selected the items, UPC shoppers correctly identified the price of 41% of the items and conventional shoppers were correct 56% of the time.

"UPC shoppers made significantly larger errors in responses than their conventional counterparts," the researchers found. The average degree of error for the items selected by the UPC shopper was 8.4% and 4.4% for conventional shoppers.

There were no significant differences in the percentage of shoppers in either type of store who made price comparisons with other types of products or in the amount of time spent shopping (not including checkout time).

Significant differences were found in this phase, however, in the difficulty shoppers had seeing prices. About 40% of the UPC shoppers reported such difficulty as opposed to 15% of the conventional shoppers.

The researchers interviewed 700 shoppers by phone at two-week intervals during Phase III of the study. During the first call, the shopper was asked to give the price of a product used in the store during Phase II.

Correct prices were reported by 20% of the UPC shoppers and 31% of the conventional shoppers.

Each shopper was also asked to give the price of nine additional food products they had purchased on their last shopping trip.

For seven of the 10 items examined, UPC shoppers reported incorrect prices significantly more frequently.

When asked to give the price of an individual item at home using all available sources of information, 20% of the UPC shoppers in the total sample reported the correct price, compared with 44% of the conventional shoppers.

Only 5.4% of the UPC shoppers used cash register tapes provided by the scanning system to determine the price of an item at home.

The only area where UPC stores came out ahead in the study was in the speed of checkout time. For the total sample, 67% of the UPC sample reported they were "very satisfied" with the checkout speed compared with 44% of the conventional shoppers.

In the area of ease of reading prices, however, conventional stores gained back their loss when 65% of their customers felt "very satisfied" with this area compared with 41% of the UPC shoppers.

The final attitude tested by the study, and probably the most crucial one to the store owner, was that of store loyalty. For the first two test periods in Phase III, the store-selection decisions of the shoppers were recorded.

During the first time period, about 43% of the UPC shoppers switched stores compared with about 26% in the conventional stores. A similar pattern emerged in the second time period when 47% of the UPC shoppers switched while 31% of the conventional shoppers switched.

UPC Group Changes Stand on Item Price Marking

(Continued from Page 1)

and the Ad Hoc Committee has agreed, that consumers would prefer prices left on, this is not necessarily a blow to the progress of scanning systems, according to some supermarket industry members.

"NCR believes that the recommendation (of the Ad Hoc Committee) has cleared the air on this issue and, as a result of this, installations should accelerate," according to Charles Truax of NCR, a manufacturer of point-of-sale (POS) systems. "Scanning systems are not dependent on price elimination to be cost-justifiable," he added.

NCR does hope that this study and recommendation will bring "an end to attempts to legislate supermarket operating procedures," he continued.

In its policy statement on item pricing, the Ad Hoc Committee said it was its hope "that this very important issue would be resolved without resorting to laws that could well freeze the entire UPC system. The industry members strongly felt that the legislative approach was premature."

California, Rhode Island and Connecticut have already passed laws requiring prices to be marked on all items in supermarkets, and several other states have legislation pending.

Sen. Frank Moss (D-Utah) has introduced a bill into the Senate, S. 997, with the same purpose. Ed Merlis of the Senate Commerce Committee, of which Moss is a member, said the study and the Ad Hoc Committee's position would definitely affect the fate of S. 997.

B&B Tests Under Way on Hybrid Monitor System

(Continued from Page 1)

The system links the capabilities of a software monitor called the Automatic Program Optimizer (APO), written by B&B, and a hardware monitor called the Program Event Recording (PER) facility, which Ayer said is built into "every IBM 370."

In order to reorganize programs for greater efficiency, users have to be able to determine the flow of logic and data references and then convert this flow information into an optimal reordering of the original program.

This is what the hybrid system does, Ayer said, adding that since the rework is done at the load module level, it is transparent to the user.

APO traces the flow information while the program is executing. It "avoids the overhead of interpretive execution and the pitfalls of software hooks," however, by using the PER, Ayer said.

Though "poorly documented" in IBM manuals, this hardware monitor is accessible, usually for diagnostic work, through the routines IBM has labeled DMSS, another B&B spokesman added.

The software monitor operates at the load module level to avoid language dependence or recompilations and has the low overhead associated with an event-driven system, he said.

The blocks selected for restructuring are the smallest relocatable code or data segments in the load module – the CSECTs, Ayer said.

No hooks are inserted into the load module so no perturbations of the measurement occur, he continued. To avoid forcing the user to supply information about the internal characteristics of the program, the monitor first reads the load module and constructs internal tables with the information it needs.

The software monitor then interfaces with the PER and either ATTACHs the program to be monitored or searches for it in a separate region. Monitoring produces a time-stamped flow of CSECT references on either a tape or direct access device, Ayer said.

APO takes the flow data, constructs a model of the program execution characteristics, applies a working set-oriented clustering algorithm to it and maps the resulting matrix into a page space representation. The recommended reordering for the load module is developed from this mapping.

B&B is at 850 Stewart Drive, Sunnyvale, Calif. 94086.

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CW I

DEC Tops Repertoire With 1088; Dual Decsystem-1080 Also Bows

(Continued from Page 1)

of a Dual Decsystem-1080, the communications, mass storage and unit record subsystem, the firm is offering a configuration with redundancy for key operations.

Thus, if a part of the system should go down, the user has a backup system available to him, the spokesman explained.

Improvements Over 1080

The configuration has typical computational improvements over the Decsystem-1080 ranging between a factor of 1.4 and 1.7, DEC said, adding this enables users to increase their workloads significantly.

The system needs no complex environmental controls and operates in a conventional computer room, DEC said.

Decsystem-1080s in the field can be upgraded to the 1088 by adding the additional processor and rebuilding the software monitor in about four hours, DEC said.

The system should be attractive to educational, business, medical, scientific and engineering users because these users are price-sensitive and need a mixture of interactive and batch computing for their applications, the spokesman said.

Disk Subsystem

The RPO6 disk subsystem introduced at the same time doubles the on-line base storage capacity of the Decsystem-10 to 5.6G characters, DEC said.

The subsystem can accommodate up to 32 drives on a single system, the spokesman added. Each drive provides 176M bytes of storage and has dual-port capability, permitting increased I/O transfer rates through simultaneous access over two channels by the same system.

Average access time is 28 msec; the word transder rate is 2.5 µsec, the spokesman said.

Users can mix the firm's previous disk drives with the RPO6 on a single subsystem, he noted. The RPO6 drive costs $34,900.

Tape Subsystem

The TU16 75 kHz magnetic tape subsystem introduced by DEC offers industry-compatible 1,600 bit/in. drives to users who do not need a high-performance production tape facility, DEC said.

The system allows these users to acquire an economical tape subsystem for file backup or for intersystem communications, the spokesman said.

A minimum TU16 tape subsystem costs $49,500 and includes a data channel, control, formatter and single drive, he added. By comparison, a high-performance 320 kHz TU70 1,600 bit/in drive costs $100,000.

The Galaxy Batch software package provides a 50% reduction in both real-time and CPU times over the previously available batch-processing software package, MPB-1, DEC said.

The package, designed to enhance DEC's batch-processing capabilities, operates under virtual memory and provides a 75% reduction in disk access over the former package, DEC said.

Galaxy Batch is included in the system price of the Decsystem-1088 and costs $3,000 for current Decsystem-10 users to upgrade from MPB-1, DEC said.

Typeset Application

The ITPS-10 application package permits users to prepare office-quality documents or camera-ready copy on Decsystem-10s. The package can be used for photocomposition, typesetting and word processing and runs under the Tops-10 operating system. The package costs $15,000, DEC said.

First deliveries of the hardware will begin in May. The software is available 30 days after receipt of the order, DEC said.

DEC's Large Computer Group is at 200 Forest St., Marlboro, Mass. 01752.

Seminar on DP Risks Set in June

CHICAGO — Analyzing and managing the risks posed by computer installations will be the focus of a two-day seminar here on June 18-19.

The seminar, sponsored by *Computerworld* and *Business Insurance* magazine, will feature 10 sessions relating to such DP topics as business interruption exposure, identification and estimation, risk management of business interruption through insurance and contingency planning for security management as part of total risk management.

Other topics will focus on handling the errors and omission risks and discussing the new generation of risks posed by recent legislation, new computers and new kinds of installations.

Risk management implications of owned vs. leased equipment, as well as the risks inherent in lease contracts, will be covered.

In a special evening presentation on June 18, attorney Roy N. Freed will discuss how a user can protect himself legally by obtaining contract clauses that specify responsibility for various risk elements.

Other speakers will come from the user community as well as from the industry.

"This is a broad-based program that will provide users with exposure to several different problems and solutions, as opposed to many in-depth seminars that are currently available," according to Edward J. Bride, CW vice-president for editorial services and program cochairman.

The seminar will be held at the Drake Hotel. Additional information is available from Crain Communications, publisher of *Business Insurance*, at 740 Rush St., Chicago, Ill. 60611.

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Fate of Payment Systems Laid in Consumers' Hands

By Ronald A. Frank
Of the CW Staff

MIAMI BEACH — The electronic funds payment vehicle is being driven by the retailers and bankers and the consumer is the passenger — but he is not sure he wants to go on the trip, according to J. Roger Moody, vice-president of AT&T.

Speaking at an Interface 76 session here last week on point-of-transaction systems, Moody said those implementing the new transaction-oriented systems will have to keep their eye on the consumer.

"These systems will be doomed to failure unless the customer feels there is a benefit to him," he explained.

Most of today's transactions involve some form of paper transfer and may include sales or payments. It is these paper transfer systems that lend themselves to electronic transfer of the information, Moody said.

It is the banking community that sits in the driver's seat to implement the emerging electronic systems, he added.

Consumer transactions are one of the most important categories for banks, according to another speaker at the session, William Stritzler, AT&T marketing manager for the finance industry.

About 74% of the "new money" flowing into banks comes from consumers, he said.

Contrary to many predictions, a cashless society is not coming soon, Stritzler told the attendees. Of the present 24? billion annual transactions, 216 billion are cash, 28 billion are checks and five billion are credit cards, he said.

Citing recent studies done by AT&T, Stritzler said eight billion transactions per year fall into the "consumer to merchant" category. This includes checks and credit-card transactions and is one of the most likely areas where banks will offer new services, he predicted.

Five billion transactions annually fall into the "business to consumer" category and include payroll checks, four billion transactions are "consumers to business," such as utility bill payments, and about three billion include "business to merchants" payments, he said. "Consumer to bank" transactions account for about two billion annually.

Together, the different types of trans-

(Continued on Page 8)

CW at Interface 76

Users Warned They Must Avoid Being Locked In by 'Two Giants'

By Ronald A. Frank
Of the CW Staff

MIAMI BEACH — Two giant companies will dominate the data communications area within 10 years and, "if we are lucky, there will be two choices" in transmission and other systems approaches, according to Dan McGurk.

It will be up to users to insist that presently available alternatives in data communications equipment and services be continued — or they will be locked in by the two giants, the former president of the Computer Industry Assocation said in the keynote address at the Interface 76 conference here last week.

Until now the real innovations in data communications have been accomplished by the smaller vendors but, unless users make sure universal standards are agreed upon, the systems and interface designs will favor the two major companies, McGurk said.

Although he did not mention either IBM or AT&T by name, it was clear what McGurk meant when he referred to "the telephone company" and "major mainframe supplier."

There is no incentive for the vendors to agree on much-needed standards for protocols, encryption, error checking and similar data communications areas, he said. As long as the standards issues remain unresolved, he explained, the vendors can change their offerings whenever they want.

If this situation continues, users will have fewer and fewer options, McGurk warned.

Advantages and Problems

Although the projected satellite networks promise many operating advantages, they will also raise new problems, McGurk said.

One of these is the question of data privacy, he noted. Every message transmitted to a satellite is like an "all points bulletin," he said.

There is a real question whether the encryption methods that have been proposed will adequately protect the privacy of transmitted data, he added.

Despite the many potential pitfalls, communications technology is still in an "embryonic stage." Present networks will seem antiquated when more advanced digital nets go on-line, he said.

Unless users take an active role in what is now developing, vendors will control both the data communications systems designs and the interface designs. "And he who controls the interface has the chance to have all of the pieces of his own manufacture," McGurk warned.

In such an environment, there is no question it will be extremely difficult to have plug-compatible replacements for individual pieces of a communications network, he said.

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Also consider the cost of maintaining your on-line system. An article in the February 23rd issue of *Computerworld* points out that over half of the CICS users had to modify the package to meet their needs, at an average cost of over $10,000. With TASK MASTER, few, if any, modifications are ever required. This could be one of the major reasons why year after year the *Datapro* survey of software package users shows TASK MASTER ranked ahead of CICS in the all-important areas of ease of installation, ease of use, and throughput and efficiency.

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Cleveland	4-28	New York	5-12	Chicago	5-26
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CDC Unveils Four-Model Cyber 18 Family

(Continued from Page 1)

[illegible], in addition to the standard peripherals costs $116,018.

Lease plans are available and first deliveries of the 18-10 and 18-17 are scheduled this month. First shipments of the 18-20 and 18-30 will begin in August.

Test Unit Debuts

Digitech Data Industries of Ridgefield, Conn., introduced its Pacer Model 103 network diagnostic test unit at the conference.

The device can monitor EIA lead status, simulate terminals, CPU, front end or modem and includes a display for test results.

In simulation modes the Pacer will poll and respond "in any discipline" and transmit user-metered test sequences, Digitech said.

A typical Pacer with a 1K-character buffer for incoming data and 256 bytes of CMOS random access programmable memory can handle full-duplex data lines up to 19.2 kbit/sec and costs $8,500, a spokesman said. Delivery is 90 days.

AT&T showed a 132-column wide platen printer for the Dataspeed CRT terminal system. The 300 line/min unit can handle up to 15-in. fan-fold, six-part printouts.

The printer operates at 10 char./in. and can handle either 3 or 6 line/in vertical spacing, AT&T said.

The unit will operate with most Dataspeed 40 configurations, but is not available in a receive-only version. First tariffs will be filed "in about six months" at an expected rate ranging from $160/mo to $180/mo, a Bell spokesman said.

CW at Interface 76

Other Equipment

Vadic Corp. of Mountain View, Calif., showed its multiline automatic calling system which is compatible with the Bell 801 system. The system can be expanded to handle up to 60 lines, Vadic said.

The calling system costs $500 for the dialer, $500 for the chassis and about $380 per line including the modem. Delivery is 60 days, a spokesman said.

Rapidfax Corp. of Fairfield, N.J., demonstrated a 20 sec facsimile capability using a 9,600 bit/sec digital transmission link with Codex modems. The demonstration utilized Rapidfax 100 digital facsimile transceivers using the Comsat Intelsat IV Atlantic satellite.

More than 60 firms participated in the Interface 76 exhibition; the conference included about 40 technical sessions with 150 speakers. Show officals set attendance at 2,800.

The next conference, Interface 77, is scheduled for March 28-30, 1977, in Atlanta.

CW Photo by R. Frank

This CDC Cyber 18-10, exhibited at Interface last week, was demonstrated running remote batch jobs on-line to a DP center in Maryland.

Consumers to Decide Funds Systems' Fate

(Continued from Page 7)

actions make up 66% of the yearly activity within the banking system, he said.

The average cost per transaction drops as the transaction volume in a network goes up, Stritzler said. Citing another AT&T study, this one in a network with 1,500 locations, the cost of 250 transaction/mo is about $1.85 per transaction.

Of this, 30 cents is allocated to the communications lines and equipment, 75 cents to the variable operating expenses and 80 cents to the fixed operating expenses which include the bank's DP costs exclusive of communications, he said.

At 500 transaction/mo, the costs drop to 47 cents per transaction, of which 18 cents is for the communications, 13 cents for variable operating costs and 16 cents for fixed operating costs, he said.

When the network volume goes up to 1,000 transaction/mo, the cost per transaction drops to 20 cents. Of this, seven cents go to the communications, five for the variable costs and eight for the fixed costs, he said.

While banks are very concerned about the consumer float issue, they don't favor elimination of the float, Stritzler said. Instead, they see benefits to be achieved by faster processing of transactions and the offering of new services, he said.

Another speaker at the session, Richard Schaeffer of Gambit Management Strategies, Inc., gave a timetable for some of the expected banking services.

While 1975 saw descriptive billing on credit statements, 1976 will go down as the year of on-line point-of-sale transactions with credit authorizations, he said.

In 1977, on-line checking and check guarantees will emerge, and 1978 will see the start of computerized financial management services on home receivers, Schaeffer said.

In 1979, the telephone will be used for point-of-sale and automatic check-cashing services, he predicted.

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Calendar

May 3-5, Hershey, Pa. – **Eighth Annual Association for Computing Machinery (ACM) Symposium on Theory of Computing.** Contact: Prof. Detlef Wotschke, Computer Science Department, Pennsylvania State University, University Park, Pa. 16802.

May 3-7, Phoenix – **1976 Association for Educational Data Systems (Aeds) Convention.** Contact: Rick Meyer, Convention Chairperson, Phoenix Union High School District, 2526 West Osborn Road, Phoenix, Ariz. 85017.

May 4-6, Beverly Hills, Calif. – **Society for Information Display 1976 International Symposium and Exhibition.** Contact: Lewis Winner, 152 W. 42nd St., New York, N.Y. 10036.

May 5-6, Philadelphia – **National Information Retrieval Colloquium.** Contact: Carolyn Trohoski, Research & Information Services for Education, 198 Allendale Road, King of Prussia, Pa. 19406.

Societies/ User Groups

May 5-8, West Lafayette, Ind. – **International Purdue Workshop on Industrial Computer Systems, U.S. Regional Meeting.** Contact: Dr. T.J. Williams, 102 Michael Golden, Purdue University, West Lafayette, Ind. 49707.

May 11-14, Boston – **Electro/76,** the Institute of Electrical and Electronics Engineers (IEEE) international convention. Contact: IEEE, 3600 Wilshire Blvd., Los Angeles, Calif. 90010.

May 12-14, Denver – **Computer-Based Manufacturing Information Systems Seminar.** Contact: The Center for Management and Technical Programs, University of Colorado, P.O. Box 3253, Boulder, Colo. 80303.

May 12-14, Atlanta – **National Automated Clearing House Association (Nacha) Conference on the Future of the ACH.** Contact: Sharon Humphries, Nacha Conference Coordinator, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

May 13-14, New York – **American Bar Association (ABA) National Institute,** exploring the legal issues and impacts of DP. Contact: John Foley, National Institutes, ABA, 1155 E. 60th St., Chicago, Ill. 60637.

May 16-19, Toronto – **29th Annual Conference of the Association for Systems Management (ASM).** Contact: R.B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

May 17-18, Minneapolis – **National Association for State Information Systems (Nasis) Midwestern Regional Meeting.** Contact: Colleen Kisch, Department of Administration, 208 Administration Building, St. Paul, Minnesota 55155.

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1) These books were written by an expert from industry, Kevin McQuillen. He's been a DP manager, consultant, and manufacturer's rep so his books are chock full of solid, practical, real world advice.

2) The content of these books is based on an analysis of the tasks normally required of an applications programmer. That's why these books contain everything of use to the average programmer, and very little that isn't. That's also why these books give substantial coverage to job control language. The DOS book covers DOS and DOS/VS. The OS book covers MFT, MVT, VS1, and VS2.

3) These books are organized by function. A complete subset of BAL is presented in the first three chapters of the book, and later chapters cover such functions as debugging, table handling, subprogram linkage, and file handling. When material is organized in this way, you learn more quickly because you always see purpose.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. As a result, you will have many models of professional coding techniques upon which to build.

Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

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WANG

Data Base Keeping Tabs on Candidates' Promises

By Nancy French
Of the CW Staff

NEW YORK – Long suspected of having a penchant for trying to be all things to all constituencies, political candidates will have to exercise more care this year because their announced positions on everything from the economy and energy to busing and abortion are being stored in a minicomputer-based data bank.

The Associated Press (AP) is using a computer data bank in reporting this year's presidential race to help spot the inconsistencies in candidates' campaign promises.

With computerized text-editing and communications systems in place for more than four years, the AP's Campaign Data Bank was a logical next step in using technology, the wire service said.

In an internal memorandum from AP General Manager Wes Gallagher written earlier this year, AP staff members were warned to become more expert "to avoid being used.

"Truth and facts disappear in a flog of generalities and platitudes, not counting outright deceptions," Gallagher said.

In addition to tripping up the candidate, however, the system is useful to the reporter who must brief himself on a candidate's positions on key issues before covering a public appearance.

It might provide the background the reporter needs to ask a candidate at a news conference whether he might be misquoting an opponent when contrasting their positions on an issue of critical interest to the voter, according to Jeff Alderman, a national news editor.

Profiles, which are more like "a bunch of facts strung together," were originally prepared by about 12 AP writers, most of them from New York and the Washington Bureau. Efforts were made to keep the text to a minimum – about 500 words per file, Alderman said.

The data can be retrieved by a candidate's name or by subject categories such as campaign strategy, personal finances, the economy, foreign policy, energy, busing and abortion, according to Howard Angione, another national news editor here.

Each candidate's progress in the primaries is also tracked and new information is added to the data base weekly. As candidates drop out of the race, they are added to a "losers file."

"We only include declared national candidates," Angione said, explaining a candidate such as Sen. Robert Byrd of West Virginia was not added since he is only running in the West Virginia primary.

On the other hand, California Gov. Jerry Brown, who has declared himself a national candidate although he is running only in the California primary, probably will be added.

The information can be accessed via CRTs in New York and Washington, where ready reference to political subjects is critical for news-editing purposes.

"In smaller cities, where the candidates are not coming through on a regular basis and only occasional reference to the Campaign Data Bank is needed, reporters may review hard copy printed out in the bureaus once a week," Angione noted.

As recently as the 1972 presidential campaign, AP reporters had to depend on their own personal files for background on the candidates.

The Campaign Data Bank is implemented on a Hendrix Electronics 3400 system which consists of a Digital Equipment Corp. PDP-8E processor interfaced with a fixed-head protract drum, a DEC PDP-11 controller with customized I/O communications interfaces and several Educational Data Systems 5200 CRT terminals with full upper/lower-case character set as well as additional miscellaneous keys, also supplied by Hendrix.

The data bank is also integrated with AP's minicomputer-operated text-editing and communications network, according to Angione.

In New York, where stories of national importance are funneled for editing from bureaus nationwide, copy is received by the PDP-8E and stored simultaneously on the drum and on disk for backup. Arrival notices bearing a file number and the first 40 words of each story are printed out when stories are received and routed to editors who then can call up the full text on CRT screens for editing, Alderman said.

Working on the CRTs, editors massage copy, reorder paragraphs, add paragraphs of support material from their files or the Campaign data bank, if necessary, and, with a few keystrokes, send an entire story to subscribing newspapers and radio and TV stations via AP's nationwide communications network.

This saves a step, since the material doesn't have to be rekeyed by a teletypewriter operator, Angione noted.

Editors Prefer Drum

Editors prefer working from material stored in the drum because of its rapid access time, Angione said. A story can be called up in about 3 sec from the drum compared to about 30 sec from the disk system.

Since the drum system costs nearly twice what the disk-based system costs, the disk was the system selected for installation in some of AP's smaller bureaus, such as Seattle, Angione pointed out.

Nine of AP's largest bureaus are already equipped with the mini-based systems to handle regional communications for wire stories not judged to be of enough importance to go out nationwide.

Ford Asks Privacy Council To Study Information Policy

WASHINGTON, D.C. – At the direction of President Ford, the Domestic Council Committee on the Right of Privacy will research the economy's growing information sector, with findings due on Sept. 1.

Issues such as the impact of computer and related technologies and the relationship between privacy and freedom of information delivery systems will be considered.

According to a spokesman, the President has directed the committee to "review and clearly define the information policy issues which confront federal policymakers, to ascertain the status of information policy studies now under way in a number of federal agencies and recommend how information policy should be handled within the Federal government."

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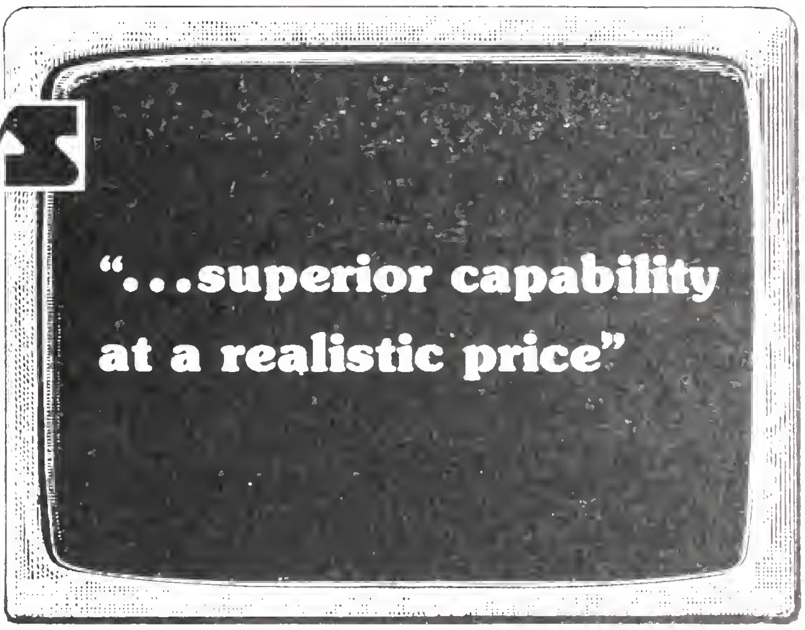

IN?UIRY/ims allows users of IBM's Information Management System (IMS) to easily and efficiently access their data bases. IN?UIRY/ims utilizes an English-like language and operates as a message, message batch, or batch program. The user does not have to know the physical characteristics or the detailed organization of the information stored in the data base.

IN?UIRY/ims is designed for all users regardless of their technical orientation.

ELIMINATES APPLICATION PROGRAMMING. Although IMS's Data Language One (DL/I) provides the programmer independence from access method, device characteristics and data storage organization, user written programs are still required to retrieve information from a data base. IN?UIRY/ims interprets English-like inquiries and converts them to the code required by DL/I to retrieve user requested information.

ARITHMETIC CALCULATIONS. IN?UIRY/ims provides the capability to perform arithmetic operation on data fields and/or constants and to return the result for action by the verb in the inquiry.

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MULTI-PATH LOGICAL OR PHYSICAL DATA BASES. IN?UIRY/ims can retrieve and logically relate multiple fields from multiple paths in either physical or logical data bases.

ON-LINE AND BATCH SUPPORT. IN?UIRY/ims will operate as a message processing program, as a batch message processing program or as a stand-alone DL/I batch program. IN?UIRY/ims in no way modifies IMS, nor is it any more dependent upon a specific version of IMS than any other IMS user application program.

TSO INTERFACE. IN?UIRY/ims provides an interface against DL/I data bases in the inter-active TSO environment eliminating the requirement for IMS data communications. This interface can be used for both data base diagnostics during program development as well as a production inquiry capability.

OPTIONAL INPUT/OUTPUT. For an on-line inquiry any keyboard terminal can be used. However, IN?UIRY/ims also supports batch mode operation in which inquiries can be made via a terminal or punched cards, and replies are made either to the terminal or a line printer.

TAILORED TO THE USER INSTALLATION. The standard IN?UIRY/ims vocabulary and diagnostic message text may be modified by the individual installation. The vocabulary which contains all words used in the language can be added to or changed for each application area if necessary and a vocabulary may be created in a language other than English. The diagnostic message text may be expanded or shortened depending upon the installation standards.

DATA FIELD SECURITY AT TERMINAL LEVEL. Access to a data base and the fields within the data base is possible only through the IN?UIRY/ims user dictionary. Since a user dictionary may exist for each terminal user, the absence of the data field definition prevents retrieval of that data element and provides unauthorized access security at the field level.

PERFORMANCE INTEGRITY. In order to minimize IMS overhead IN?UIRY/ims has implemented inquiry page and time limit specifications by IMS logical terminals. This capability allows a user to stop an inquiry after a page and/or time limit and free IMS resources.

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Thank you, Atlanta!...

The world's tallest hotel (b), the Peachtree Plaza, was the site of the Caravan Forums(r) in Atlanta as Computer Caravan 76 enjoyed its fourth successful visit. As an important local event, WSB-TV Channel 2, covered the Caravan and interviewed Forum Director Ed Bride (k). . . . Meanwhile, at the Atlanta Merchandise Mart, other DP management people were looking over the equipment and services being presented. M.R. Cully of Computer Sales and Services, Inc. of Florida liked what he saw at the Lockheed booth and purchased four System III's (approximate value $120,000) from Gino Toigo, Lockheed's Southeast Sales Manager (n). At the General Electric Booth (d) current GE customers from DeKalb County School Systems and the University of Alabama (e and h) look over the Terminet 30 as they consider upgrading their installations.Genesis One Computer Corporation extended their tour on this year's caravan because of the high-level turnout which pleased their local salesmen says Michael Brody, Vice-President Sales, Charles Pratt, Southern Regional Manager and Daniel Kail, Vice-President Marketing (c). John Maquire, President of Software ag (center) discussing DBMS studies resulting in selection of Adabas. For Software ag, Atlanta was second only to New York in potential sales (q). ... Other things to see included: Varian's new 64K memory, V76 computer and small, operating data base (f); Paradyne's family of High Speed Modems (g); Sycor's complete line of distributed data entry and processing equipment (i); Magnetic media of all kinds from Memorex (m); Wang Laboratories' demonstrations of their wide variety of processing applications software for their WCS series of computers (j); Texas Instruments' "Silent 700" electronic Data Terminals and 990 family of microcomputers (p); magnetic media products from Wabash Tape Corporation (s); and ENTREX's family of shared-processor data entry systems, as demonstrated here by Marylin Adams (l)

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COMPUTER CARAVAN 76

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Had Access to DP Center

Twelve Implicated in College Grade-Switch Scheme

By Ann Dooley
Of the CW Staff

BROOKLYN, N.Y. – Twelve persons at Brooklyn College who had access to the school's computer center and or the registrar's office have been implicated in a grade-changing conspiracy, according to Harold Harris, spokesman for the college.

The individuals who participated in the grade-fixing episode allegedly did so through a computerized transcript file, which was implemented in 1974 as an offshoot of a larger effort to gather information faster and more efficiently.

The changes occurred when the manually prepared records were transferred to the computerized system, Harris said. The school is now using an IBM 370/145.

The individuals, past or present employees at the college, reportedly made a total of 69 grade changes. The alleged "upgrading" occurred either on their own transcripts or on the transcripts of friends or relatives.

No bribes were reported to have been taken and the 69 changes were limited to a total of 13 students' records.

"The college is convinced it was a small group of workers who made changes for their own benefit or for that of friends," Harris said.

Won't Say How

School officials refused to comment on the method used to access the system because they said it might encourage similar attempts at other schools.

"These people knew how to operate computers and were sophisticated in that knowledge" was the only comment Harris would make.

The *New York Times* reported, however, that in order to retrieve a student's transcript from the Brooklyn College computer, all that would be necessary would be access to a terminal, knowledge of the code and the student's Social Security number.

The City University task force has since studied the computer center and made certain recommendations which would greatly decrease the risk of unauthorized grade changes, Harris said, although he would not disclose them.

According to the *New York Times*, some people felt security was lax, but the task force found security conditions were good and told the college, 'Beyond a doubt the advanced state of data processing at Brooklyn College makes your student records more secure than those in completely manual operations."

Tampering Uncovered

The record tampering was discovered several months ago when a student's transcript that showed graduate eligibility was disproven after the student's professor denied giving out the grade recorded for one of the courses.

Shortly after that, spot checking revealed other irregularities. A faculty committee was established to review student records and assure "student academic records are complete, accurate and in conformity with college regulations," Harris said.

The faculty committee conducted an audit of 630 September 1975 graduates and 1,300 January 1976 graduates. The transcripts were compared with the hand-entered grades filled out by the teachers themselves and no additional changes were discovered other than those to which the 12 had admitted, Harris said.

A total of 1,900 transcripts were audited from the school's total enrollment of 37,000 students.

Independent Inquiry

Dr. John Kneller, president of the college, which is in the City University system, asked the city's Department of Investigation to conduct the independent inquiry. The department refused to comment until the investigation is completed, saying "the investigation is being conducted with all haste within the limits of thoroughness."

The college has rescinded one degree of a graduated student and 10 full- or part-time employees either quit or were fired. The school has not released any names of those involved.

"The college is not out to persecute any person," Harris said. "The Department of Investigation, however, has the authority to turn over the information to the district attorney if it feels further prosecution is warranted."

Faculty members feared that unless action was taken to quickly and decisively clear up the question of transcript fraud, many graduates would find their academic credentials unfairly questioned.

HIS Sets Symposium On Privacy This Week

SCOTTSDALE, Ariz. – Honeywell Information Systems (HIS) will hold its second privacy symposium here this week – this one to focus on multilevel system access control, advances in data base and network security and computer auditing.

Scheduled for April 6-7, the meeting will feature as keynote speakers Minn. State Sen. Robert Tennessen, a member of the Privacy Protection Study Commission, and Clarence Spangle, HIS president.

Other speakers at the two-day session will be drawn from government, education, finance, insurance, business and data processing.

The discussions will not be geared to Honeywell systems specifically, although the state of the art of computer security from the hardware and software architecture point of view will be discussed, according to Jerome Lobel, HIS manager of computer security.

In addition, proposed and existing privacy legislation as well as government and industry responses to the legislation will be examined.

The registration fee is $350, and further information is available from Lobel at HIS, P.O. Box 6000, Phoenix, Ariz. 85005.

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2. Military Applications for Microcomputers.
   (Joe Genna - Delco Electronics)
3. The Effect of LSI Technology on Memory Systems.
   (Dan Bowers - Bowers Engineering)
4. Interfacing the Analog World to Minis/Micros.
   (Larry Brown - Calex)
5. Integrating OEM Peripherals into Computer Systems for End-use.
   (Martin Himmelfarb - Digital Design)
6. Microcomputer Software and Hardware Development Aids.
   (Dave Millet - NEC Microcomputers)
7. History to Current Development of Memory Peripherals for Mini and Micro Computers.
   (Bill Frank - Cal Comp)
8. The Make or Buy Decision.
   (Robert Van Naarden - DEC)
9. Microcomputer Applications; Logic Replacement; Minicomputer Replacement, New Products.
   (Jerry Ogdin - Microcomputer Techniques)
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City, State Share DP Mapping Costs

By John P. Hebert
Of the CW Staff

ATLANTA – An investigation of where street lighting was needed to deter crime led the City of Atlanta to a geophysical computer-controlled mapping project at a minimal cost to the city.

The project appealed to private industry and the Georgia state government, which could both benefit from up-to-date maps of the city and, more importantly, share costs.

An initial study, performed in 1972, indicated that graphical representation on a map sheet of crime statistics might have great value in police beat assignments, street lighting patterns and accident analysis, according to Victor M. Davis Jr., graphics project leaer for systems and programming of the City of Atlanta.

It was determined, after several natural gas line ruptures and explosions that knowing the location of utility transmission systems might very well pay off for all concerned.

From this point, the city began studying the various types of hardware and software available for a system that would answer its needs, Davis said.

The Georgia Computer Mapping Program (GCMP) is now a joint effort involving the city, the Georgia Power Co., the Atlanta Gas Light Co., Southern Bell Telephone and Telegraph Co. and the Georgia Department of Transportation – each company or agency taking an equal share of the burden and benefits of the project.

The biggest problem in undertaking a project such as this, Davis said, was in getting a data base "so all could refer to the same grid – to the same point on the face of the earth."

Fraction of Cost

Because the city "combined forces with the local utility companies and state government, they got the maps they needed in their respective endeavors and we got our data base" at a fraction of the cost which would have been spent, Davis said.

The total cost for the city and each of the four partners in the project was $400,000. It included $50,000 solely for the data base and $350,000 for the hardware – a California Computer Products, Inc. (Calcomp) Model 748 flat-bed plotter, a Calcomp Model 942 digitizer, an IBM 029 card punch, a Sanders Associates Adds 900 system display generator unit and console and a Varian V74 CPU with two 29M-byte disks, Davis said.

The state was brought in on the project when "we got snowballed by a photogrammetry salesman," Davis recalled. Photogrammetry is the science of making reliable measurements by the use of photographs.

"All of the concerned parties were being bombarded with various proposals by photogrammetrists engaged in the commercial reproduction of orthophotographs. Of the whole group, the state had the only qualified photogrammetrists available and their help was requested.

"As a result of this request, the state became interested in the joint project and asked that it be allowed to enter it as an equal partner," Davis explained.

The city and other parties concerned agreed on the use of the State Plane Coordinate grid system, allowing everything on the surface of the city to be filed by an address code and a street code which would be represented by a system of X-Y coordinates, Davis said.

15 Master Maps

The systems and programming department has made up 15 master maps covering the entire city on the plotter which is run from a plot tape taken off the data base in the computer room and put on a Calcomp 925 controller.

After being plotted, they are passed out for distribution to all city departments, which can order individual, detailed maps if necessary, he added.

The centroids, or the X-Y coordinates for each address in the city, are valuable, Davis said. But they cost "just under 20% of the total cost of the data collection system. Anybody who ignores that is missing a valuable buy," Davis remarked.

The centroid plotting system does not only allow the analysis of crime statistics, but also provides a basis from which to analyze fire statistics, underground digging and a host of other applications.

The city also now has the flexibility of graphics and has recently become involved with computer-aided design.

"It's a by-product of getting into the mapping first rather than the rest of the project being a by-product of an involvement with computer graphics," he said.

Aside from the $400,000 initial cost for each partner in the project, there are costs for the four programmers' and Davis' efforts on the project each year for the next three to five years, Davis estimated.

The city will need that programming effort because "somebody's got to keep the system up because of change and it will probably take that long to cover enhancements that will be dreamed up" for the flexible system, he said.

However, Davis foresees hardware upgrades being minimal for the next five years.

The city is experiencing a problem with the Sanders graphics CRT terminal, Davis said. But "there will be problems with line jump tolerances with any refresh tube," he said.

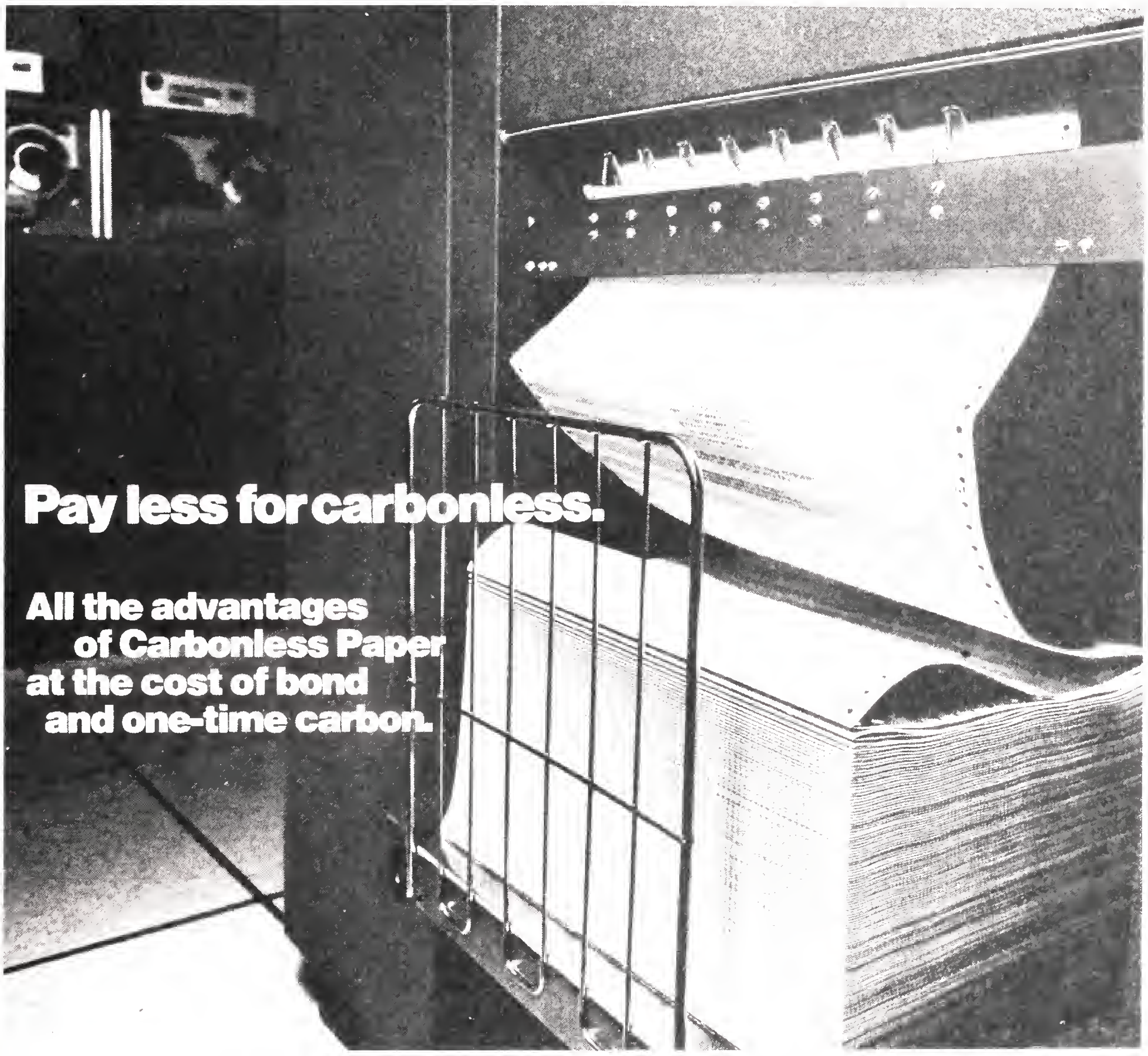
All of the records necessary to perform the updating are a matter of public record and could be theoretically obtained from a service bureau operation interfaced with the local government.

However, the accuracy of these computer-updated records is liable to be considerably greater if the local government has a vested interest in the records, he noted.

Private industry is now getting ready to use the system. It is taking maps from the city and putting its own outside plan information into the system, Davis concluded.

CW Photo by J. Hebert

Jim Little calls up a downtown street grid on the city's Sanders Associates Adds 900 system terminal.



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Editorial

A Lesson for the Industry

It's now official – even the grocery industry has admitted that consumers need and deserve to have individual prices marked on items, even if a store runs an automated system that can read the Universal Product Code (UPC).

A recent study commissioned by that industry shows that customers "experience a measurable reduction in price awareness" in stores that do not put prices on individual items (see story on Page 1).

The whole sorry story of experience with the UPC to date has been one of technology misapplied and misdirected.

This has led to confusion on the part of the general public and a number of commercial failures in the computer industry itself with a resulting loss of jobs and revenues.

Unfortunately it all could have been avoided.

As happens so often in a technological industry, too many marketing people and developers assumed that just because a system was possible technologically it would be accepted by the public.

But consumers were never consulted. The computer industry and the grocery industry rushed a system into production and use that was not wanted, never explained and that ultimately failed.

If the industry had early in the game commissioned studies of consumer attitudes and concerns, it might have avoided the fiasco, or at least learned how to handle the conversion from a labor-intensive business to an automated one.

Finally, after several years of attempted marketing, at least three commercial failures in the computer industry and a marked lack of success, the industry has decided to begin talking to consumers. This is like locking up the barn after the horse has fled.

All during the past few years, the technologists have concentrated on what is essentially a phony issue – that of price marking.

The industry has tried to justify the cost of the very expensive scanning systems on the savings that could be made through the elimination of price marking on individual items in stores.

This blindness to consumer needs led to a number of laws prohibiting the removal of individual prices and a great deal of consumer resistance to the systems.

However, the real savings from such systems do not come in the area of pricing but rather in the "back room" operation where such devices can help stores manage their inventories better.

At the same time, the use of such systems – with prices on the items as well as the UPC – do offer the consumer real benefits in faster checkout and more efficient service.

The industry should never have raised the false issue of the savings from the elimination of pricing, but rather should have stressed the real advantage to both consumers and stores with the systems.

But that would have been more difficult and would have called for better and more complete systems from the industry.

So everyone took the easy way out – offered partial systems with no real advantages to either store or consumer.

The results were predictable, but unfortunately thousands of people in the industry had to suffer the consequences of lost jobs because of the industry's naivete and blindness to the real world.

Hopefully everyone will have learned a lesson from this fiasco and will be more cognizant of consumers and their real needs in the future.

'Do You Mind if He Goes First? He's Our Best Customer.'

Letters to the Editor

Laws Prevent Dissemination Of Reports Indiscriminately

The editorial cartoon appearing in the March 1 issue of *Computerworld* conveyed the view that the release of information by credit bureaus for unauthorized purposes is unethical. In fact, such practice is illegal.

The Fair Credit Reporting Act (FCRA) specifically lists the conditions under which a credit report may be issued to a governmental agency.

Contrary to the cartoonist's implication that credit information is released by credit bureaus indiscriminately, governmental agencies may obtain a report only if they intend to use it to consider an individual for credit, employment, insurance or other benefit or to review or collect an account.

Otherwise, only identifying information may be provided to governmental agencies without the written authorization of the subject of the report.

J.V. White
President
The Credit Bureau, Inc.
Atlanta, Ga.

Caravan Didn't Goof

Perhaps the Computer Caravan did not goof after all in leaving the final zero off 1001100 [CW, March 22]. The Caravan's computer had probably noted that the Spirit of 76 was actually born in 1738, which, I seem to recall, was the year George III first saw the light of day.

M. Stuart Lynn
Houston, Texas

CW Off the Hook

I recently attended the Computer Caravan exhibition in Washington, D.C. There, I picked up a novelty button from *Computerworld*. I'm sure CW has received comments about this particular button since it read: The Spirit of 100110.

I understand this was a printer's error (the period was intended to be another zero), but let me note a redeeming fact: Indeed, if read as it appears in binary, it translates as "The Spirit of 38." However, the binary system is only assumed.

If, instead, one assumes a base which is approximated by the number 2.32718, then all is well again with the world.

And so, technically, CW is off the hook. And I will continue to enjoy The Spirit of 100110.

Dwayne S. Roberts
Northfield, Vt.

DPers Must Prove Competence

What objection does Anthony A. Schroeffel [CW, March 15] have to an individual's demonstrating his commitment to honesty and competence "down in the pits" and realizing his own capabilities in not only his own eyes, but also in full view of a public standard?

I've been down in those pits and have seen plenty of characters in this business who have nothing else to show.

The sooner we get out the better for us, professionals or not, and the better for the public.

J.A. Wilkins
Austin, Texas

(Other letters on Page 18.)

Data Past

Five Years Ago
April 7, 1971

NEW YORK – Western Union Telegraph Co. lost a lawsuit to Law Research Service, Inc. as a result of the service bureau's failure to perform contracted obligations. Actual damages awarded to the legal research firm were over $1 million.

NEW YORK – Recent power fluctuations that caused automatic emergency shutdowns and consequent loss of city computer time prompted officials here to begin looking for voltage regulators and auxiliary power units. The police department's Sprint dispatching system and the budget and finance departments' operations were listed as likely candidates for such equipment – if funds could be found.

Eight Years Ago
April 3, 1968

LONDON – International Computers Ltd. (ICL) was formed as a joint venture by three British computer makers with government support. The formation of ICL was conceded to have been engineered and promoted by the British government's Industrial Reorganization Corp. in an effort to capture an increased share of the European computer market for British industry.

NEW YORK – Investors in computer stocks found their positions deteriorating with the general market during the week as the Dow Jones Industrial average dropped 14 points to 826. Firms making core memories fell victim to a recent wave of trade magazine articles predicting the replacement of magnetic cores by thin-film plated wires and LSI technology during the next three to five years.

Dear Computerworld:

I (borrowed) (stole) (shared) (copied) this issue of *Computerworld*, and it made me:

- PROUD
- SKEPTICAL
- ANGRY
- PLEASED
- INVOLVED
- AWARE
- CURIOUS
- EXCITED
- DEMANDING
- FURIOUS
- INFORMED
- SURPRISED
- ALL OF THE ABOVE

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70 Lawyer, Accountant
80 Librarian/Educator/Student
90 Other

Detach here, fold, and place in post-paid envelope attached through binding.

The Worm in the Apple

Well, I was right the other day, when I wrote about the enthusiasts. They really are wild, these computer hobbyists. And I can easily watch the enthusiasm grow; my own wife has caught the bug!

We went off to our first meeting, the Homebrew group. There were over two hundred attendees; no formal registration; very little organization; copies of the newsletter available, with the suggestion of a donation; no formal presentations.

There were frequent references to the equivalent Los Angeles operation, the Southern California Computer Club. Already there is informal interchange of news, expertise, and even software, between the northern and southern activities. I was reminded of the formation of chapter-level Special Interest Committees in ACM, but of course the hobbyists are free of the shadow of a central or incorporated (or, to be blunt, experienced) group. The session verged on incoherence many times, and could have come apart at the seams, or turned into a raucous flea market, except for the fundamentally intellectual bent of the men – and the few women – present.

The focus is on LSI: on the power and beauty of microprocessors and micromemories. And on their cheapness, needless to say. CPU and RAM (read-only memory) and PROM (programmable read-only memory) chips were described, displayed and sold – often with only the barest description of function – for a few dollars each.

The Stanford Linear Accelerator Center has a policy of offering meeting facilities to groups of interest to its employees, and had furnished Homebrew with a fine small auditorium. But SLAC insists that no money actually change hands, at least openly. The chaffering proceeds so loudly that you can be sure sales and swaps are going on just outside the doors, and in the parking lot. And there are highly informal exhibits, hampered by the lack of easily accessible electrical power; these also point toward, ah, consummation. But not in the lobby!

Inputs range from the recital of the serial number and label on a single fortuitous chip, and requests for dope about what it might be, and be good for, to highly sophisticated description of hardware – tape drives, even! – salvaged from abandoned systems or purchased from employers.

To revert to the metaphor in my title, one can see the fruit ripening. A lovely Delicious, handsome in size, rewarding to bite into, nourishing. But alas! there is an ugly worm. It is, to use the kindest possible word, dishonesty. Clearly a great many of the items being traded are hot: stolen goods. And remember, especially here in Semiconductor Gulch there are unexampled opportunities for casual pilferage and planned theft. Trade papers report the appearance of great quantities of stolen chips, often substandard. Somewhere between Singapore and Sunnyvale, several *million* dollars worth of easily transportable goodies have already been ripped off.

Mind you, SCCC and Homebrew are not major outlets. Professional thieves want to unload their loot in much larger quantities. But attendees are customers at retail and surplus shops, which in turn are hungry for new and cheap merchandise. There will be customs searches, and police raids, and the rest of the apparatus of enforcement. Hopefully, not too many of Us will be involved – only Them!

But there is a much uglier worm in this great new apple, one much more dangerous in the long run than the maggots of petty pilferage. It was obvious from the first mentions of software, at both COMPCON and SLAC, that a stunningly large percentage – perhaps a majority – of the enthusiasts regard systems and applications programs as fair game: at best, common property; at worst, subject to undetectable rip-off.

Quite a bit of this is just plain stealing. "Loan me that [paper] tape for a couple of days and I'll make a few dozen copies." And at the other extreme, there are people *anxious* to share their home-written software, people who want it tried out, and used, and who want only feedback on the bugs as compensation. What disturbs me most is the middle range: the counterculture attitude: private property is an obsolete idea. "Steal this book," say the Hoffmans and the Rubins. It sounds good. The government, the insurance companies, IBM and DEC look like fair game. But from there to Intel and Data General is an easy step, and downward to the struggling software house of the individual consultant even easier.

I hope some small fraction of the hobbyists and home computer enthusiasts read this column: those who are already in the business professionally, or who are students with library habits. Please, those of you who do, spread the word: "Play clean!" Don't copy copyrighted software. Don't steal program products from Altair. Don't abuse your company or college access to expensive systems and games, and to technical data, which you would not be welcome to as an individual.

It is as immoral to steal software, or to buy hot chips for a hobby computer, as it is to swipe fancy goodies in a supermarket or department store. I'd like Big Business and Big Government to be ethical, and so would almost every hobbyist. Let's set them an example!

Herb Grosch

Although Not Yet Recognized

'Second-Collision' Errors Can Cause Problems for DP

Some years ago Ralph Nader made a name for himself by pointing out the elementary fact that there is always a "second collision" in a car accident.

The first collision was of course when the car hit another car or a tree or something, while the second collision involved people inside the car who had not been directly hurt by the first collision.

The Taylor Report
By Alan Taylor, CDP

After years of argument, the result was safety belts, which may be tiresome, but which are saving lives.

Somewhat similar situations arise in data processing. There are, as we all know, system crashes and failures. Many of these failures can occur in minor ways, and almost so inevitably as to be forgivable in themselves. However, second-collision effects can occur when these minor errors are being rectified – and these collisions can be much more serious than the original problem.

Norman and Virginia

Take, for instance, the case of Norman's $700 check. The check was paid into Virginia's (Norman's wife's) account at a branch of the First National Bank of Boston late in February. Virginia's deposit slip read $700, as did the check. But one of the perhaps inevitable problems then arose. The check was miscoded and forwarded into the updating routines as a $7 check, not a $700 one.

The inevitable happened. Some checks bounced. Small, personal and embarrassing ones. One day, coincidentally, just as the movers were coming in, First National sent Virginia notices of the bouncing checks and just about destroyed what composure she had left from the trauma of moving.

Luckily, by that time, the original check was back with Norman, so the mistake would be seen. Armed with the canceled check, Virginia went to the bank, and that was where the real trouble began – the second-collision trouble that is.

A Part-Solution

The bank officer seemed to regard the external problems as being Virginia's, not those of First National. Rectifying the error – that is, crediting the $693 dollars, he was happy to do. Reversing the three bounced check charges that had been made against the account he agreed to do also – but that was as far as he wanted to go.

In short, he was looking only at the internal changes that had occurred as a result of the bank error, not the external ones.

But, for Virginia, the external problems were a lot more important than the internal ones. She thought her name would be mud with people like the school bus company, etc.

For her it was important that the bank own up to its error. She wanted the bank to write to the people concerned and tell them it had been the bank's fault, not hers.

The bank officer just didn't see it that way, none of the written policies said this is what should be done. At the most, he felt it would be all right for the bank to write to Virginia. Then she could take the letter around to anyone she cared to. But he saw no use in the bank sending out the letters, even though he agreed it had been a bank error.

Avoiding Second Collisions

This is a pretty good example of one of the most common "second-collision" errors. Virginia, Norman, etc. were not really upset, or at least not permanently upset, over the original mistake. A coding error is understandable to them.

But the failure of First National to head off the problems that arise in the second collision was different.

It wasn't that First National was actually unwilling to do it. Vice-President Harlan told me the bank really feels anyone in these circumstances is entitled to have the letters sent out.

But he also told me that as far as he knows, there is no written statement to that effect anywhere, so the [illegible] people who are employed by the bank have to make their own mind up as to what to do. And that is the problem from the computer systems point of view.

Yet, computer system failures are to be expected. They [illegible] be avoided. The way to protect against them is to have procedures.

The First National case is not an isolated one, nor does it apply only to First National.

In the installation of computer systems or in the running of them, procedures for handling these second collisions should be written up and distributed. That way quite a lot of the [illegible] to computer systems can be [illegible] and economically avoided, which would help everyone.

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Letters to the Editor

Mailing Labels Can Be A Pain in the Asinine

For many years I have actively pursued a vendetta against unsolicited mail. But alas, I fear those heinous perpetrators of such extraneous material have dealt me a mortal blow.

After numerous obnoxious notes stuffed inside envelopes stamped "Return to Sender" and sent to those dullards responsible for the mailing lists, indicating my earnest desire to be removed from same, a computer has finally accomplished what mere men have failed to do ... totally insult me.

Among the mailings I have recently received, one came addressed to "G EDWARD SNYDER SYS ANAL." Another came addressed to "G EDWARD ANAL." It's not too difficult to deduce what happened.

After devoting many years of my life to the advancement of computers, one has just done IT to me. In the name of Edgar Ebedie I would exhort all my fellow computer professionals to actively guard against similar asinine, albeit humorous, oversights.

After all, nobody likes to be the butt of a joke.

G. Edward Snyder
Los Angeles, Calif.

Cobol No Problem

I have been reading the same complaints in this column about debugging Cobol programs. I hesitated to write until now because I felt other Cobols surely must have a debugging system comparable to that of Computer Sciences Corp.'s Infonet time-sharing system.

Programs compiled with a compiler option produce an internal symbol dictionary, which is invisible to the user but points to all the data items and paragraph names in the load module. This allows the Program Checkout Facility (PCF) to work in conjunction with the program.

For example, assume that a program fails due to an I/O error. The standard error convention points to the line in the source program where the error occurred.

The user can now say "SHOW (data item)" to find out the value of different data items at the time of failure.

To debug a program, a user can use "implants" or runtime patches to the load module. The user can specify something like "At Par1 (2); Show Item 1 Item 2" or "At Para; Stop."

In the first example, every time the second sentence of the paragraph called Par1 is executed, Item 1 and Item 2 are displayed. In the second example, when execution reaches the paragraph called Para, execution halts.

The user can now display all items and/or he can change them to be a different value and then resume execution.

The high-level language user only needs to know a few simple high-level commands to debug his program. Any debugging system that requires the programmer to familiarize himself with octal or hexadecimal is totally against the modern computer philosophy of making the hardware invisible to the users.

Paul D. Blumstein
Torrance, Calif.

SSA Has Its Pride

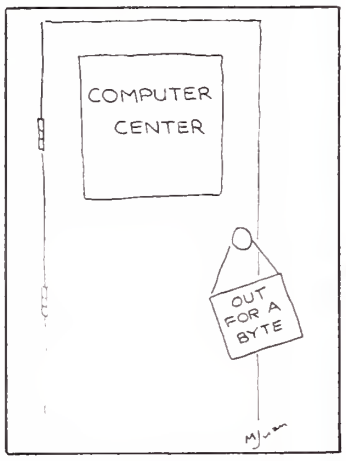
Herb Grosch was inaccurate in his Feb. 16 column, "Hugh But Harried," concerning the Social Security Administration's (SSA) technological innovations in data processing.

The 77 collator, 1975 optical character recognition system and ASP software had their "grass roots" conceptions with SSA data processing professionals.

There was pride and continues to be pride in the job we do at SSA, right down to the GS-4 tape handler who Grosch referred to as "extremely nondedicated."

As one proof of our proficiency, I suggest he ask his relatives the last time their SSA benefit check did not arrive on the third of the month!

Edward R. Coady
Director
EDP Central Operations
Bureau of Data Processing
Social Security Administration
Baltimore, Md.



The three advantages of advertising when almost everyone is hiding.

1. Your company stands out.

A very comprehensive study,* covering 26 years of data from 1947 to 1973, shows that companies who don't cut advertising during a recession year do better in sales *and profits* than those who pare their budgets.

And when sales rebounded, the non-cutters rebounded a lot better than the cutters did.

Sales index of budget-cutters and non-cutters

	1968	1969	1970	1971	1972	1973
Maintained budgets in 1970 & 1971	100	118	123	135	156	200
Cut budgets in both 1970 and 1971	100	111	109	111	122	145

2. Your brand stands out.

A McGraw-Hill survey of their business magazine readership indicates that a company's advertising can affect a company's reputation. Some of the reader comments:

"If I didn't see their ads, I would begin looking for a second source of supply because I'd consider them a dying organization."

"I feel that a strong ad indicates strong management."

"I buy from someone who advertises ...it spells quality to me."

3. Your salesmen stand out.

An article published in the Harvard Business Review ("Industrial Advertising pays off," Harvard Business Review—March-April, 1970) shows that sales costs are reduced when a strong advertising program supports a sales program. The total cost of selling to groups exposed to advertising often *drops* by 10% to 30%.

On the other hand, the non-advertiser stands at a serious disadvantage in a well-advertised market. His cost of selling to groups exposed to his competitors' advertising may actually increase 20% to 40%. This isn't a happy thought in times when you're selling less.

*For a copy of this study entitled "How Advertising in Recession Periods Affects Sales," send $1.00 to American Business Press, 205 East 42 St., New York, 10017.

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Projects Which Failed

An Old Man Remembers Computing's 'Good Old Days'

By Miles Benson
Special to Computerworld

"I can remember back to the days when computing was really exciting," he said, stroking his long and graying beard. The rocker creaked as he moved back and forth, punctuating his reminiscences.

"People who dreamed about becoming millionaires had a good chance of making it happen. Computing was the darling of funding for anyone who even hinted that electronics or programming were involved in their proposed business.

The Sociology of Computing

"And to make the stakes even higher, price/earnings ratios were out of sight for that kind of company, so that, once started, the stock value would multiple to the point that the founders could almost sell out and retire before marketing their first product."

He paused in mid-rock, leaned forward and relighted his pipe carefully, so as not to touch his beard. He puffed deeply, and the smoke rose and hung in the air about him, partially obscuring the lines of aging extending out from the corners of his eyes.

"But that was back in the '60s – the 1960s," he added, as if clarity were needed. "The world was my electronic oyster then, and the future was as bright as the horizon was distant."

This was the part of the story I always liked best. My grampa rocked a little faster in this part of the story, and his eyes sparkled, and sometimes he even put me down from his lap and would dance a little jig.

I didn't understand very many of his words, but I liked to feel him come alive again.

"I was working for the National Bank of California when it all started, not making much money, but with a good, solid job. I had been in computing for about 10 years then, and computing was a new enough field that a 10-year person could know every facet of it, inside out. I was active in the local professional society, and I had plenty of peer contact with people from other installations."

"Well, one night after our meeting – we called ourselves the Association of Bit Twiddlers" (he always laughed a hearty laugh here, and I bounced in sheer joy on his lap until he settled back down) "a bunch of us went over to a – er – soda fountain and began talking about philosophy and life and what we were doing for our futures.

"And the more we talked, the more we realized that between us we had the seeds of a new business.

"There was Taylor Washburn from the university. He'd been studying the up-and-coming time-sharing field, and he believed in it with a fervor that was like a preacher preaching sometimes.

"And there was Myrna Weatherby, from the telephone company, who was an MBA and understood business like no one else I ever knew.

"And Pete Percival, from a computer vendor, who had more on-the-job training in marketing than it seemed possible for a five-year man to have had.

"And me. The software man's software man, and the hardware man's hardware man. Ah, those were the days."

No Jig Yet

He stirred a little, and I thought the jig was coming, but it didn't.

"The four of us must have talked until four in the morning, we were so excited. Taylor had this idea. Time-sharing was not only academically exciting, he told us, but there was money to be made in it, too.

"It was a whole new way of computing, and a better way, and we were present at its very beginning. Why not form our own business?

"The question hung in the air for awhile the first time he asked it. It was too scary to touch. What made it scary was that it made sense. I think Pete was the first one to break the silence. Good old Pete, always full of enthusiasm."

Grampa always choked up a little at this point. Pete died a few years ago, and Grampa had been pretty sad for a while after that.

"Anyway," he went on, the vigor of the story pulling him past the moment of sadness, "Pete almost shouted his approval of the idea. He was tired of working for somebody else, letting them make the big entrepreneurial money while he just took home a salary and some commissions. He wanted in, to be on the inside, to be making decisions, to be selling for himself.

"It didn't take much to get the rest of us moving. That stuff about working for yourself rang a responsive chord with all of us. Myrna lauched into a discussion about stock offerings and loan availability, and I just quietly sat there and configured up a time-sharing machine in my mind.

"We didn't rush into anything, but we didn't let grass grow under our feet, either. We kicked that idea around for two or three months and then went to work on it.

"Pete did some market research, and Myrna talked to lending institutions, and Taylor reviewed the computer conference proceedings for new ideas, and I began doing systems analysis for the [illegible] new company on [illegible].

"And we pulled it off."

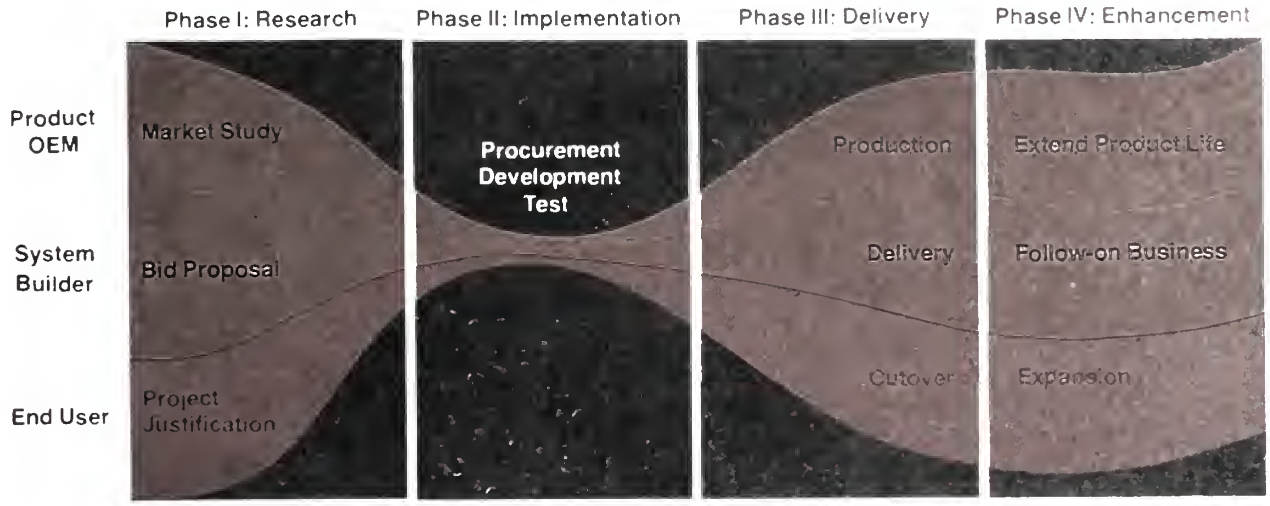
Grampa was really getting into the story, now. "We bought an old Buick garage which had been abandoned for a few years and put the best darn time-sharing computer around in the former shop area and refurbished the executive office into our executive offices and ..."

The words went tumbling out almost faster than Grampa could form them.

"My office had carpeting an inch thick and a mahogany desk big enough to stretch out on if I wanted to ..." Grampa was a big man, and I liked to think of him lying down on this huge desk.

(Continued on Page 20)

MORE COMPUTER LIFE SUPPORT: PACKAGED SYSTEMS FROM INTERDATA



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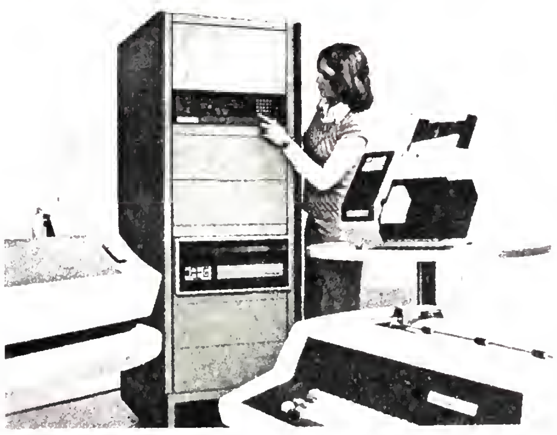

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"Why MARK IV? Twice the productivity with no increase in staff."

By Jim Harder
Manager, Technical Planning and Development
Boise Cascade Corporation

"Within the past two years we were able to support twice as much development activity without a staff increase, largely due to MARK IV.

"Not only that, most of our MARK IV Programs are completed significantly under traditional Cobol programming estimates, as much as 100% below Cobol estimates. A combined program to create files from our labor distribution input was budgeted at $3000. We did the job for $1200. The reporting programs were estimated at $3900 and we spent $2500. And these results are typical.

"With MARK IV you get a lot of work done both easily and quickly. We recently converted a chain file maintenance system — an antiquated IBM bill of materials access method — to DL/1. MARK IV reduced what would have been a major project in Cobol to nothing more than a slight change in file definition. With MARK IV's independence of files and access methods, we were home practically free — we did the job in a day.

"A lot of our old assembly-language-based programs are very difficult to maintain, so we're converting them all to MARK IV. We've put up several data bases in MARK IV to get our systems into a more maintainable environment.

"Programmer acceptance of MARK IV is excellent. Since it does away with so much of the busywork of Cobol, it lets analysts become programmers and vice versa. Our people can get involved in the whole problem.

Our end users not only like it, they recommend its usage. Several people in our Compensation and Benefits area who have become proficient in MARK IV are running a DL/1 data base covering 30,000 employees. They do all their own report writing. Most of their stuff is ad hoc, and they are able to respond very quickly.

"There's no doubt about our enthusiasm for MARK IV. We're super happy."

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An Old Man Recalls DP's 'Good Old Days'

(Continued from Page 19)

". . . And windows with a view of Lake Washington and storage that climbed the walls full of *my* listings of *my* operating system for *my* computer."

And it happened, as I hoped it would. He swung me down from his lap and straightened his gnarled body from the chair and danced a circle around me standing there, my smile about as wide as his, holding my hands in his big warm old ones.

"*My* listings of *my* operating system for *my* computer," he chanted as he danced, and slowed, and sank back into the rocker, and pulled me back into his lap.

"I had that office for a little over a year, and I enjoyed every minute of it. That was the happiest time of my life.

"The business started slowly, and then caught on, and it looked like Taylor and Myrna and Pete and I had been right on. We were busy in those days, really busy, what with doing our work and hiring additional people and training them and becoming managers and watching the profits and the expenses and . . . . well, we were all really happy then."

It was like he was adjusting his whole composure. His exuberance was draining into melancholy. "Business began falling off. Our noses were too close the to grindstone to realize why.

"Myrna caught on, though. The recession of 1969 was sliding into the depression of 1970. Time-sharing services, the world at large seemed to believe, were expendable. The old ways cost less, and money was more important than service in those trying times.

"Well, bankruptcy isn't so bad, I guess, once you're trapped in a position where it's the only way out. We closed the doors of that posh old Buick garage, and walked away, and blinked back the tears.

"To tell you the truth, child, I didn't manage to blink back all the tears. I cried that day, like a baby. I cried, I really cried . . ."

Grampa drifted off and was quiet for awhile. As he sucked his pipe, the glow made a momentary brightness in the darkening room.

"But I bounced back, and so did the others, by golly. See this gold watch?"

"National Bank of California gave me that when I retired last year. You know, a secure life is pretty nice, when you come right down to it. Who wants to be in business for himself all his life?"

I never believed Grampa when he told this part of the story. There was a funny little choke in his voice when he said it.

"Well, off to bed with you, child," he always ended. "That's enough of my ancient stories for tonight." And he would set me down and whack my bottom, and I would scamper off upstairs."

But I knew that he always sat there for awhile afterwards, rocking slowly, the glow from his pipe the only light in the room.

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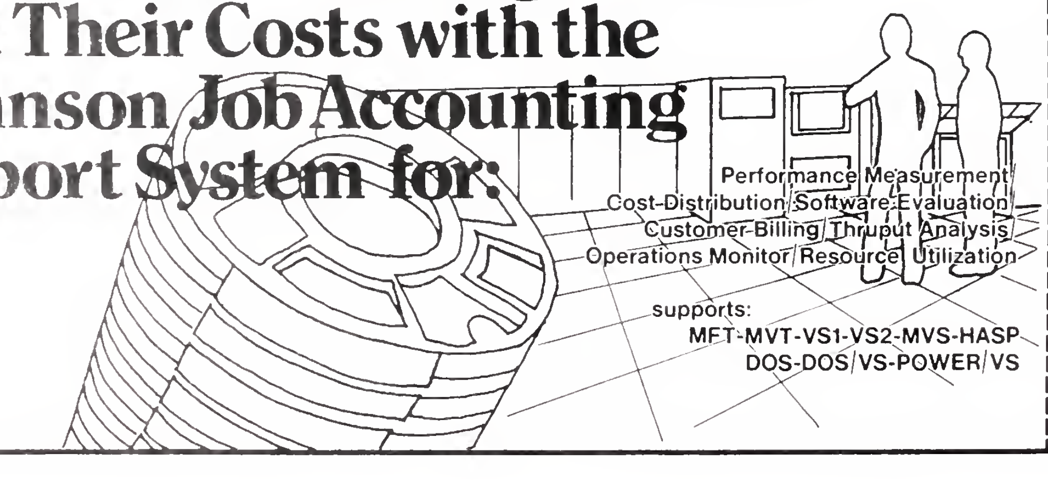

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APL Network Users Stress Need for Technical Help

By Don Leavitt
Of the CW Staff

GREENWICH, Conn. – The most important features of remote-computing networks offering APL services "generally revolve around the quality of people – the technical support available at the [network's] center and branch locations," according to a recent study of APL users in the northeast U.S.

Conducted by Real Decisions Corp. (RDC), a consulting firm in the remote-computing industry, the study noted the APL users' concern for good technical people "plus the educational support and training [vendors made] available" closely paralleled the interest of users of other languages, covered in other RDC studies.

But the APL users also rated the advanced formatting capabilities provided by most of the networks as "essential," and that was not typical of other users. It was, perhaps, an indication that without enhancements such as formatting, APL would be far less used than it is.

Features involving files, languages and terminals fell behind the people-oriented concerns of the users. File security and sharing of files between users were equal in overall importance to the ability to access files and programs from languages such as Basic, Cobol and Fortran, the study summary said.

The median expenditure for outside APL support among the 25 using companies interviewed was $40,000/year; the mean was $55,000/year, the research group found.

The total APL expenditure for the group was between $1.2 million and $1.4 million, while the total outside expenditure was between $3 million and $4 million, RDC added.

Interviewed in December and January, eight of the users said they would reduce outside APL expenditures in 1976. Six others expected to maintain their outside commitments and 11 said they would increase their outside APL costs this year.

Four of the eight planning decreases in outside APL work were installing APL on in-house IBM mainframes and another three were purchasing IBM 5100 portable computers, which can support APL.

Only one user was planning to reduce the overall use of APL and that, according to RDC, was a result of "general economic conditions."

Even within the confines of APL, the use of more than one remote-computing vendor by a single organization appeared in the RDC results. Twenty-eight contacts with eight vendors were reported by the 25 user companies. Scientific Time Sharing was the heaviest used vendor, with 10 of the 28 references.

The users showed limited concern for the competence of vendor sales representatives, the ability to access peripheral devices and the availability of batch mode operation. That would appear to be an indirect reflection of their heavy interest in using APL for mathematical, statistical and plotting or graphic output, all of which focus on quick answers to one-time problems rather than recurring production runs, RDC indicated.

Twenty-five users mentioned fast development time as an advantage of APL over other languages. Fourteen also noted it was easy to maintain, largely because of "flexibility."

Complaints were less frequent and more scattered in their focus. A dozen users said the language was not good for I/O and large data-handling chores.

After that, the largest group with specific concerns were five users who said it was not good for production runs with iterative routines and another five who were concerned about the cost of using the language.

Although the APL study summary apparently is not available for general distribution now, RDC said it has published reports including "A Comparative Time Sharing Cost Analysis Report" and "A Comparative Remote Batch Cost Analysis Report" which are for sale.

RDC is at 270 Greenwich Ave., Greenwich, Conn. 06830.

Random Notes

'Intercomm' Enhancement Free From Consultants

SAN FRANCISCO – Diversified Programming Services – which normally offers system engineering support for users of the Intercomm teleprocessing monitor from Informatics, Inc.'s Programming Methods Division – is now offering a free enhancement it developed for the monitor.

The modification is said to reduce CPU utilization and EXCPs by as much as 50% for Intercomm users who also utilize IBM's Virtual Storage Access Method (Vsam) files.

The enhancement is available from Diversified at 136 Everson St., San Francisco, Calif. 94131.

Graphics Added to Mark III

ROCKVILLE, Md. – General Electric has installed an interactive business graphics package on its Mark III remote-computing network. Plot is said to be capable of generating a variety of plot types for users with little expertise in software or computer languages.

Described as less expensive than graphics facilities on other networks, Plot may be run on most character printers and on the Zeta plotter.

The graphics support can be interfaced with the network's financial analysis language, the vendor said.

'Libra' Upgraded by SMM

SACRAMENTO, Calif. – A CPU scheduler and partition balancer for IBM DOS/VS users, Libra from Software Module Marketing (SMM) has been enhanced in two ways, the vendor said.

Libra can now display VS paging rates on command and it can notify the console operator when IBM's paging monitor deactivates, according to SMM.

The package has helped users increase throughput by more than 30%, the company claimed, by allowing the overlapping of I/O and CPU activity.

Libra is currently available for $2,150. The vendor is at 1007 Seventh St., Sacramento, Calif. 95814.

B&B Links Accounting, Analysis To Define, Defeat VS Flaws...

SUNNYVALE, Calif. – The Computer Accounting System/Computer Performance Analysis (CAS/CPA) packages from Boole & Babbage, Inc. (B&B) were designed to provide greater accuracy in charging for resource usage and to develop understandable reports on computer activity, the vendor said.

Working from logic built into its earlier CAS package, B&B added "more than 60,000 lines of new code" to include "everything" customers and prospects said they wanted in a job accounting/statistical reporting program, a spokesman added.

Some features introduced with the enhanced package are support for the "Multiple Virtual Storage" releases of IBM's OS/VS and VS accounting. B&B's VS accounting provides for separate charging for real and virtual storage, paging, swapping and VIO paging, he said.

CAS/CPA also tracks physical tape- and disk-mounting activities and permits the use of differential costing for job selection priority levels, he added.

Runtime improvements in CAS/CPA are said to reduce the CPU time needed to process monthly System Management Facility (SMF) records by 50% or more and to reduce EXCPs by 70%.

Overall elapsed time is less than 25% of what it used to be, B&B indicated.

Job turnaround analysis reports produced by the CAS/CPA combination can be used to verify or refute user claims of long delays in processing of jobs. Used with other reports, they can also determine the source of problems in this area, the spokesman said.

The analysis reports on abnormal endings (Abends) is intended to give insight into those problems, while the report on workload utilization of devices identifies potential bottlenecks and inefficient usage of the peripheral units, he added.

Total cost of CAS/CPA is $11,000. The packages may be purchased separately for $7,500 each, the vendor said.

B&B is at 850 Stewart Drive, Sunnyvale, Calif. 94086.

...'Vispa' Course Looks Ahead

McLEAN, Va. – The Virtual Storage Productivity Aid (Vispa) package, now available from JRB Associates, Inc., consists of a set of analytical software programs and a course of instruction to help users "exploit the full potential" of IBM's VS environment, according to the vendor.

The software tools provide a means of identifying potential problem programs in VS and a measurement facility to quantify each program's effectiveness in such an environment, a spokesman said.

In addition, it monitors the programs' execution behavior to determine how the programs reference pages in memory.

The course of instruction, entitled "Efficient Programming for Virtual Systems," provides a performance improvement checklist to help streamline existing programs. The checklist can also be used to encourage the development of future systems, JRB added.

Developed by Morino Associates Inc., the Vispa software consists of two processes.

The analysis facility runs with the programmer's problem program to accumulate information on page-reference activity. With this data, Vispa can summarize working set requirements, page reference statistics and Csect usage, the vendor said.

The instruction component is said to provide concepts, techniques and guidelines for effective VS program design and coding. Contained in a notebook and including text, illustrations and exercises, the course can be used as the basis of a two-day traditional classroom lecture or for monitored self-instruction.

Applicable to both OS/VS1 and VS2 environments, Vispa is available for a one-time charge of $7,290 from JRB at 1651 Old Meadow Road, McLean, Va. 22101.

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'Cryptopak' Codes User Data

BETHESDA, Md. – Computation Planning, Inc. (Complan) has two "software engineering" tools for use with Fortran or Cobol programs in IBM 360/370 or Univac 1100 series environments.

Alfabit is a generalized character- and bit-string manipulating and testing library subroutine package. Callable from the user's program, it provides numeric and nonnumeric data transformation capabilities and sells for $6,250 for IBM shops, $6,450 for Univac sites.

Cryptopak is a set of Alfabit-compatible subroutines for performing both strong-algorithm and long-key cryptographic transformations of data. The strong-algorithm capability is an exact software emulation of the federal hardware-based encryption algorithm proposed by the National Bureau of Standards, Complan said.

Cryptopak sells for $3,750.

Complan is at 7850 Aberdeen Road, Bethesda, Md. 20014.

NSCRS Builds Consulting List

DANVERS, Mass. – DP professionals with expertise in software areas – systems people analysts or application-level programmers – are being sought for inclusion in the National Software Consultants Referral Service (NSCRS) based here and now in pilot operation.

The service is an attempt to bring interested consultants and available jobs together, with screening by NSCRS.

Consultants are listed through payment of a subscription fee and submission of a short resume-like profile form. Clients seeking help from the consultant base contact NSCRS directly and are not charged for any referrals provided, the service's proprietor noted.

A "significant percentage" of the subscriber's $50 annual fee will be used for direct "intensive" advertising directed toward prospective clients throughout the country, NSCRS said.

The matching process – handled manually now but expected to be automated "soon" – [illegible] client needs and subscriber [illegible]. Some consultants are only interested in small contracts they can handle part-time since they are fulltime employees elsewhere, the service spokesman said.

On the other hand, he noted, consultants with specialized skills will be suggested to clients without regard to geographic area. In any case, once a client is given a subscriber's name, the subscriber is notified by post card, NSCRS said.

Normally, it would be up to the client to contact any of the subscriber referrals deemed most appropriate.

The service has been approached by some consulting companies that wished to subscribe but since the service is intended primarily to support the individual consultant, NSCRS has attempted to discourage "company" listings.

The company subscription fee is $300/yr, the spokesman added. NSCRS is at 8 Gates Street, Danvers, Mass. 01923.

CRT Used for Programmer Test

NEPTUNE, N.J. – A programmer's working knowledge of IBM's OS/VS environment can be tested and compared with the knowledge of others having a similar background through a service developed by the Insco Systems Corp.

The service is available on a remote-computing basis through the facilities of Telenet. The test itself is designed for use on a CRT terminal, which Insco will provide if a user doesn't have one.

Made up of multiple questions with multiple-choice answers, the entire exercise takes no more than an hour and a half "and a programmer may finish with time to spare," Insco said.

The test is divided into a number of sections focusing on such specific areas as the internals of the operating system; the job control language; and programming languages, in particular Cobol. It is clearly not an aptitude test, the Insco spokesman said, though he said it could be used as a screening tool for job applicants.

"We compare the profile of the programmer taking the test with the statistical profile we have accumulated of other programmers who have taken the test and who claim the same level of experience," he said.

Currently, profiles have been developed at the zero-to-12-months, 13-to-36-months and over-36-months levels.

A bar graph shows the programmer's scores in each section, along with an indication of whether that is fair, average, good or superior.

A single test can be administered for $75, but Insco provides lower rates for clients who use the service for a number of tests, the spokesman added for the firm at 3501 Route 66, Neptune, N.J. 07753.

ASI Meeting to Aid DP Trainers, Others

CHICAGO – Training techniques applicable to data processing, management, manufacturing and marketing will be covered at the 7th annual professional training conference scheduled for later this month at the O'Hare Inn, according to the sponsor, Advanced Systems, Inc. (ASI).

Sessions on DP will include how to implement training for systems analysis, programming and operations personnel; IBM's Information Management System; and in-house computer-assisted instruction applications. The training implications of converting to OS/MVS will also be covered, ASI said.

A video update of IBM's System Network Architecture (SNA) and Synchronous Data Link Control (SDLC) will be the subject of still another session, a spokesman noted.

Sessions on administering video-assisted instruction and developing video and graphics techniques for in-house systems are also scheduled. In addition, participants will be free to preview more than 750 educational programs in ASI's curriculum, the sponsor said.

An NBC Washington correspondent, Peter Hackes, and Pat Coleman, TA consultant, will be principal speakers at the conference planned for April 26-27. The registration fee is $60.

ASI can be reached at 1601 Tonne Road, Elk Grove Village, Ill. 60007.

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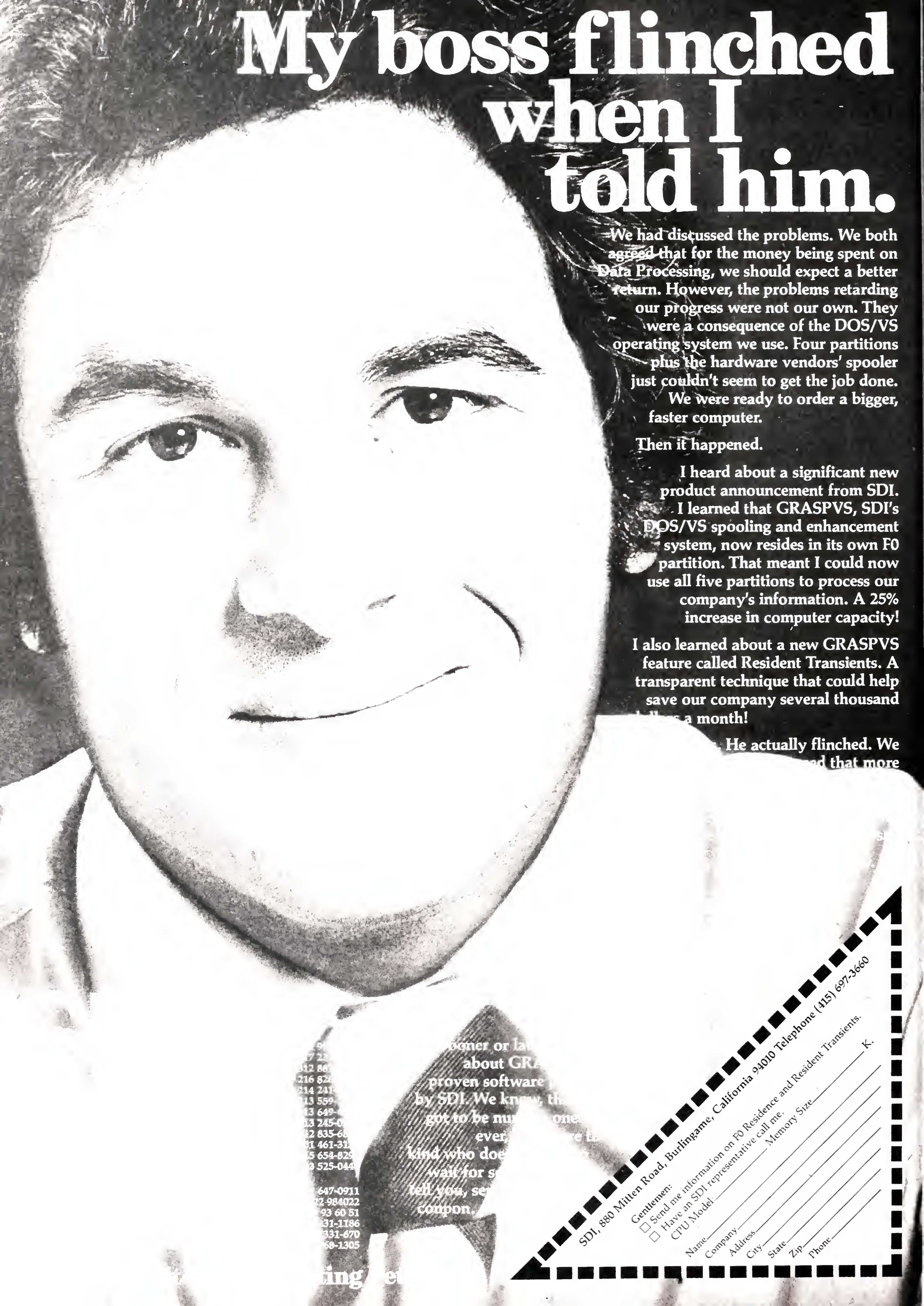
My boss flinched when I told him.
We had discussed the problems. We both agreed that for the money being spent on Data Processing, we should expect a better return. However, the problems retarding our progress were not our own. They were a consequence of the DOS/VS operating system we use. Four partitions plus the hardware vendors' spooler just couldn't seem to get the job done. We were ready to order a bigger, faster computer.
Then it happened.
I heard about a significant new product announcement from SDI. I learned that GRASPVS, SDI's DOS/VS spooling and enhancement system, now resides in its own F0 partition. That meant I could now use all five partitions to process our company's information. A 25% increase in computer capacity!
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Seeing Human Problems Part of DP Management

By Jack L. Stone
And Alexander P. Grant
Special to Computerworld

As the costs of computer hardware continue to fall, personnel costs become an increasingly large percentage of the DP manager's budget, and attention is shifting toward ways of improving the productivity of employees.

To date, this shift in emphasis has focused on the increased use of subject matter training designed to improve knowledge of computer technology.

Little has been done to develop a comprehensive approach to dealing with all the factors that influence personnel productivity. As a result, many DP managers have become disillusioned with current piecemeal efforts to deal with the problem of developing and motivating their work force for improved performance on the job.

This is the first in a series of articles by these authors outlining the problems facing DP managers - and solutions available to them in training and motivating staff members.

From the overview provided in this article, the authors will describe in some detail the concepts behind "human resource management" in the next one.

The harsh reality is that human relations and personnel development in the computer center are in a terrible state. Why has this happened?

In the early days of data processing, the major costs of processing information were people costs. In that era, obtaining, training and developing people were the principal supervisory activities.

The skills, knowledge and motivation of analysts, programmers and operators were well recognized as being essential to successful operation of the DP system.

With the introduction of medium- and large-scale second-generation equipment in the computer center, this emphasis on people for productivity was abruptly dissipated. In the early 1960s, typically 70% of the cost of DP in these centers was for hardware. Naturally, the major focus of DP management concern shifted to the cost-effective use of computer hardware.

Today, the balance of costs has again shifted. Nearly 70% of the costs of DP in major centers is for people. It is, therefore, time for renewed and expanded DP management concern for improving the productivity of their people to meet organization goals.

Developing Productivity

Before proceeding, it is useful to review the major factors involved in developing employee productivity.

First, the individual must have sufficient knowledge of the data processing system environment to perform his job well. The kinds of knowledge needed include information about: equipment; control programs; applications; and computer center and user organization responsibilities, procedures and communications.

Second, the individual must develop the special skills necessary to perform his particular job.

Third, the individual must possess the motivation to do the job well. High motivational levels are derived from a successful blending of many factors: satisfaction of personal needs, objectives and aspirations; supervisory and management leadership, relationships with co-workers; and the organizational environment.

In addressing the challenge of developing the "human resource" to increase organization productivity, DP executives must recognize that there are deep-seated problems that must be countered:

- DP management teams, having concentrated on hardware/software systems problems during the last decade, have not been able to spend the time required on a primary management responsibility, personnel development.

- Many employees with strong technical capabilities become disenchanted and frustrated with organizations when they learn their immediate supervisor is not technically current.

Employee productivity rapidly decays and relationships with the supervisor deteriorate as their mutual respect fails. Most supervisors require extensive and regular technical updates.

- A fundamental premise on which employee motivation is predicated is the existence of a valid, individualized career plan for the employee.

Although considerable lip service has been applied to career planning for DP personnel, it is rare to find an organization which develops the plan with employee participation and follows through in an intelligent and thoughtful manner.

Peopleware

- Communications external to the center with users, executives and vendors have historically been poor. Center personnel continually feel "put down" as they are subjected to external complaints regarding lack of performance, when, in fact, the fault often lies with the complainant.

When these communications failures continue over long periods of time, frustration levels increase and employee performance wanes. There has developed a general need for reassessment of organization communiations with the objectives of resolving chronic interdepartmental communications problems.

- DP training for computer center personnel has traditionally been lecture-oriented. There is growing concern that the lecture strategy does not develop sufficient interest among attendees to promote positive motivation and assure retention of learning.

Fortunately, there is a large body of experience in using additional instructional techniques to improve motivation, to sustain learning retention after class completion and to promote follow-on self-development.

There is the need for management to learn of these techniques and to reassess the cost-effectiveness of their current training programs relative to the use of these techniques.

In conclusion, DP management generally relies on technical training alone to develop increased productivity. But, while good training produces increased motivation, the improvement is only temporary if the employee returns to a work environment which causes continuing employee frustration.

This is why many managers are dissatisfied with their current training programs. DP management must become increasingly sensitive to the fact that employees increase their productivity when they are confident they have the skills and knowledge to perform, the environment encourages their performance, and they feel they will be recognized and rewarded for good performance.

Stone is the managing director and Grant a senior associate of Computer Education International, Inc., of Washington, D.C.

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DOCS is available from C F S, Inc. as a licensed program product and may be leased monthly, yearly or on a one time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

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Enhancements Make Difference

Fortran Called Best Language for Growing DP Sites

By Tim Hagen

Special to Computerworld

In the late '60s and early '70s, structured programming arrived with a roar and bandwagon effect second only to the arrival of computers themselves. Articles appeared in every trade magazine, each with its chart of the elements of structured programming, an awe-inspiring list of advantages and a caution that structured programming was more than modular.

Some the these articles seemed to be dripping with relief. "Thank goodness we've found a legitimate reason for PL/1!"

At the time, PL/1 was indeed the most powerful language for structured programming. Cobol was a close second and business Basic a third. Those who disliked Fortran did not miss this opportunity to point out its unsuitability for pure structured programming.

Here To Stay

It is fair to suppose structured programing is here to stay, its advantages far outweigh the disadvantages. The main advantages are readability (and therefore maintainability) and the fact that structured programming tends to force poor programmers into a better product than they would produce otherwise.

Good programmers will usually produce a good product in any environment. In fact, as many point out, their programs were essentially structured even before structured programming became the rage.

If management wishes to maintain the maximum option possible with respect to equipment choice, it is unlikely to choose PL/1 as its standard programming language for lack of wide implementation; RPG, for lack of wide implementation and generality; or Basic, for lack of a standard, readability and execution speed (as most frequently implemented).

Analysis

That leaves Cobol.

Cobol Incurring Disfavor

Cobol is widely taught, widely implemented and highly standardized. It lends itself fairly easily to structured programming, but it seems to be incurring some disfavor because of its "verbosity."

Some vendors have worsened the programming situation by "pulling a PL/I," i.e., introducing Cobol-Fortran hybrids that look like Cobol in the setup area and like Fortran in the program area.

But there have been two developments in recent years which make standard Fortran an alternative to Cobol or one of its reduced verbosity dialects. These are the Fortran Language Extended Control Structures (Flecs) preprocessor and the Fortran data "structure" generator.

Flecs, developed and available for a distribution fee of $100 from the Computing Center, University of Oregon, Eugene, Ore. 97403, has been implemented on a score of different machines, including the IBM 360 and the Decsystem-10. It is currently being used at more than 90 installations across the country.

The Flecs programmer writes in a language that mixes structure specifications with standard Fortran statements. The menu of structure specifications and their variations is exhaustive, far richer than PL/1.

A Flecs source program may be truly structured with no statement numbers needed (even for END= in READs), although statement numbers may be used. The Flecs preprocessor converts the program to a standard Fortran IV program and generates a lovely level-indented listing.

Second Development

The Fortran data "structure" generator, called Item Definition (ITDEF), is implemented in highly transportable Fortran and may be licensed for $50 from the Pacific Institute of Marine Sciences, Box 86, Government Camp, Ore. 97028.

ITDEF accepts record format descriptions, including field widths, format codes and names, and generates standard Fortran IV code which has a remarkable resemblance to, but is more useful than, a Cobol Data Division structure.

Included are comments, type declarations, DIMENSION, COMMON, EQUIVALENCE and FORMAT statements as required to implement the input data structure in Fortran IV. Variable names are alphabetized in type, declaration and DIMENSION statements.

Any Number of Records

Output may be punch, print or both at the option of the user, and any number of records may be included in a single run. Advantages of ITDEF are automatic construction of code for easy change, automatic construction of FORMATs and reduction of COMMON and input/output lists to a single variable.

Alternately, ITDEF might be used simply to generate alphabetized type declaration and DIMENSION statements.

Returning to the original issue, Cobol is where it is because it has data structures, alphanumeric capability, government support and therefore wide implementation. But the advent of Flecs and ITDEF makes Fortran not only the first high-level language, the first standardized language and the world's most widely implemented language on all sizes of machines, but also the most sophisticated structured programming language and one which has Cobol-like data structures.

More optimized compilers are available for Fortran than any other language. Properly written, Fortran IV is, hands-down, the most transportable language. Having taught Cobol and Fortran at the community college and university levels, I believe Fortran is easier to teach and learn.

The alphanumeric capabilities of Cobol can be easily had in Fortran and do not come close to justifying (by themselves) the choice of Cobol over Fortran, given Flecs and ITDEF.

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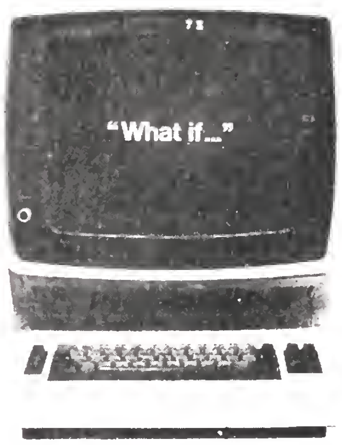

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COMMUNICATIONS

May Reduce CPU Storage Needs

With IBM Changes, Tcam Won't Need Vtam for SNA

By Ronald A. Frank
Of the CW Staff

WHITE PLAINS, N.Y. – The teleprocessing software changes recently announced by IBM [CW, March 1] will allow users of the Telecommunications Access Method (Tcam) to directly support terminals that operate with the Systems Network Architecture (SNA).

The significance of these changes is that the Tcam user will be able to install SNA devices without having to add the Virtual Telecommunications Access Method (Vtam), according to an IBM teleprocessing specialist.

The elimination of the second access method, required in the past, is accomplished with a direct interface between Tcam and the Network Control Program (NCP), he explained in a recent interview.

When Vtam was added to Tcam, "significant storage requirements were added to the system." It is expected the new approach of linking Tcam directly to the NCP "will use significantly less storage," the IBM specialist said, but exact amounts of storage reduction are not yet available.

Users now using Tcam through Vtam for SNA terminal support could convert to the direct Tcam interface, support the same terminals and "we would expect there would be some storage savings," the specialist said.

Additionally, it will probably be easier to deal with one teleprocessing access method instead of two, he pointed out.

Implementing the Interface

In order to implement the Tcam interface, the message control program will communicate with NCP software that will be written.

"There will always be some teleprocessing support code that stands between the message control program and the lines and terminals, and that will be written to interface with NCP," the specialist said.

From a user's point of view, message-processing programs will be handled in the same way as message control programs. This means the software changes will essentially be transparent to existing applications running with Tcam through Vtam, he explained.

"There will be NCP-compatible modules added to Tcam. Previously Tcam supported binary synchronous and start stop devices through the Emulation Program; what we are adding is the capability to interface with NCP and Synchronous Data Link Control [SDLC] devices," he said.

Analysis

The Tcam changes will reside in the 370 CPU, although there may also be some teleprocessing modifications made to NCP software which resides in the 370X front end, he said.

These changes will affect the relationship between the front end and the CPU, but will not alter the line-handling characteristics of the user's network, he observed.

There will probably be some capability to take greater advantage of Tcam network operator control functions with the direct interface to NCP, the specialist said.

The network operator control functions relate to available operator control commands which give the console and terminal operator the ability to add or remove terminals from the network; the Tcam interface will have some "enhanced operator control commands consistent with the support of SNA devices," he said.

The SDLC devices which will be supported by the Tcam interface are the 3270 CRT, 3600 finance terminal system, 3614 cash dispenser, 3767 terminal and 3770 terminal family.

Specifically excluded are the 3790 terminal, 3650 retail store system and 3660 supermarket system, which are supported as SDLC devices under Vtam but not under Tcam.

For VS2 Release 1.7, which is SVS, there is no current Vtam support for the 3650 and 3660 systems, he said.

The Tcam direct interface for NCP will operate with VS1, MVS and SVS, which means it will be supported for all OS systems under which Vtam operates. A major difference is that Vtam operates under OS and DOS while Tcam is limited to OS systems, he noted.

The recent software changes also will allow users of the Time Sharing Option (TSO) to interface with Vtam and certain SDLC terminals for the first time. In addition, the changes will permit an SDLC terminal to be shared between TSO and other applications such as IMS, CICS and other software systems that use Vtam, he said.

Front-End Shoppers Urged to Consult Other Users

By John P. Hebert
Of the CW Staff

ATLANTA – "If you get away from IBM, participate in user groups – that's where you really learn what's going on," according to Howard Granger who, along with Randy Wewer and Winston Gregg, conducted a recent Computer Caravan workshop on "Front-End Processors" here.

"Five years ago, we were babes in the woods, so we didn't just talk to vendors about equipment we were considering," Wewer said, acting as spokesman for the three, who are corporate officers of the Credit Bureau, Inc. (CBI).

It might be hard to stay in IBM territory when looking for all the equipment necessary to permit network flexibility at the emulation, terminal and file levels of a system, Granger indicated.

"You can't depend on one vendor for all these things. That's why we're a mixed shop," he said.

CBI has an IBM 370/135 and a 370/168; IBM 3270-type Raytheon PTS-100 terminals operating at transmission speeds between 2,400- and 9,600 bit/sec; Centronics printers; Teletype ASR 33s and 35s; and different vendor's modems, tape drives and processors, according to Gregg.

In addition, the company has two Comten 3670 intelligent front-end processors operating in duplex mode and 3650 controllers on the West Coast.

Users should exercise caution when shopping around for front-end processors, Granger said, because of the many products available and because of equipment limitations peculiar to each piece of equipment.

"The IBM 2701 and 2703 and the Memorex 1270 are reliable; they've been around for a long time and they're good for the small shop. But they are limited in terms of the line types they use and throughput capability and they load the CPU because software control must be on the mainframe," he said.

Flexibility Advantage

The advantage of a programmable front-end processor is its flexibility in offloading the CPU, supporting multiple CPUs, having a common terminal interface, providing line-switching capabilities and utilizing the inherent error diagnostics, Granger noted.

If the decision is made that a front-end processor is necessary, "define your requirements," he advised. System reliability may be the most crucial factor in determining needs, he indicated.

"If you need 100% uptime, you know you've got to have fine tolerances before you even talk to the vendors." And redundancy, for example, "is not realistic for many shops. How much redundancy do you really need to have built into the system?" he asked.

"Once you go out into the marketplace, the vendors will crawl out of the woodwork," he said.

Users should look for a proven product and get customer references from the vendor. "If you buy something and six months later the company is gone, you're hurt," Granger warned attendees.

"I made 200 phone calls to different users and asked them questions. They are usually more than willing to talk to you," he said.

"And hold the vendor contractually responsible for obligations. Don't assume! That's been our whole train of thought in acquiring front-end processors," Wewer added.

"Get a commitment in writing and talk with users," he said.

CRTs From Independent Minimize Firm's Claims-Processing Costs

INDIANAPOLIS – To minimize claims-processing costs, Blue Cross/Blue Shield here has installed several hundred 3270 CRTs from an independent vendor. The non-IBM CRTs operate with an IBM 370/158 and 168 to handle medical claims.

In place of the former keypunch-batch computer method of claims processing, the daily workload of some 8,000 Blue Cross and Major Medical claims is now being handled on-line by a small number of claims people working with CRT display stations.

This has speeded up payments to members and providers of service. Payments to hospitals, which used to take an average of from 10 days to two weeks, now frequently take only two to three days, thus improving the hospitals' cash-flow position, according to the user.

Last summer the firm replaced more than 200 IBM 3270 display terminals and associated control units with functionally identical Computer Optics CO 77 information display units.

"Our three-year contract with Computer Optics yields us a price reduction in excess of 40% vis-a-vis the IBM rentals in force when we made the decision back in

(Continued on Page 30)

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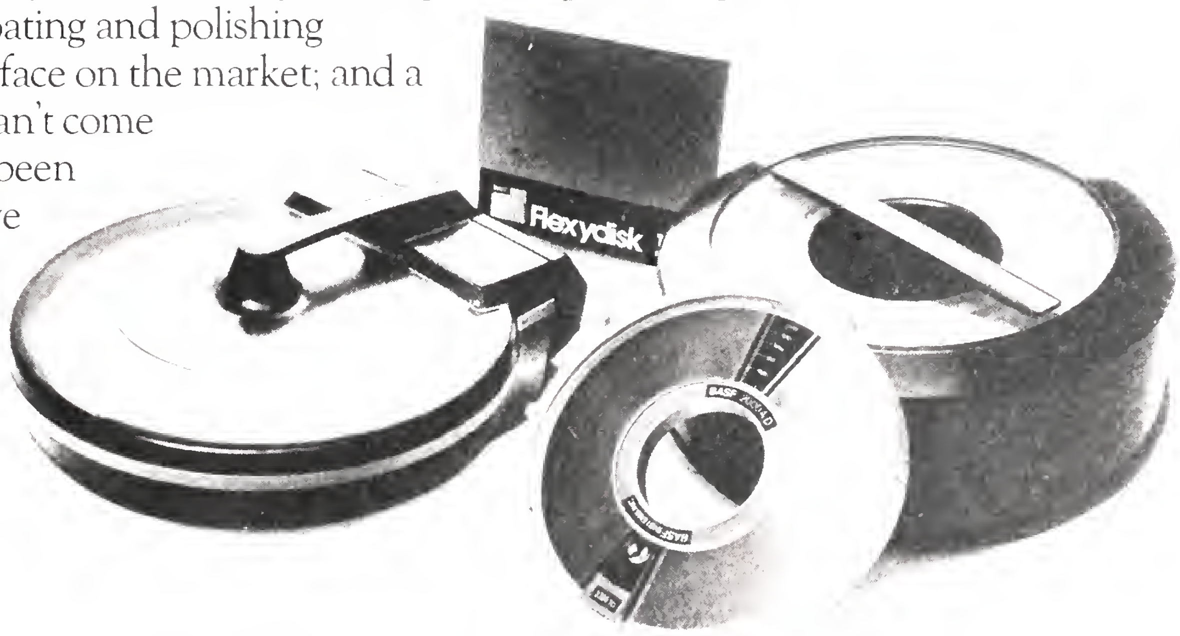


BASF The Original.

Computer Tapes   Disk Packs   Flexydisks   Word Processing Supplies

Independent CRTs Cut Firm's Claims-Processing Costs

[illegible] *Page* [illegible]

April 1975 — Maurice Taylor, DP chief, [illegible]

[illegible] of new hard- [illegible] installation [illegible] seven control [illegible] is de- [illegible] with the dis- [illegible] to the IBM [illegible].

Indiana Blue [illegible] displays pri- marily [illegible] claims [illegible] and on-line [illegible] them for [illegible] financial mod- [illegible] and various IBM Time-Sharing Op- [illegible] (TSO) applications.

The company [illegible] for computer-aided rather than fully automated claims proc- essing to ensure that every claim is sub- jected to the critical judgment of a hu- man processor. In any event, the firm feels there would be relatively few claims that could easily be paid automatically, a spokesman said.

Claims processing is divided into two phases — claims support and actual process- ing. Claims coming in through the mail are first sorted into categories in the claims support area.

Using the keyboard display terminals, the operators assign a claims number and receipt date to each claim and enter this and other skeletal information into the system. The data entered is immediatley verified by the display. For example, the membership file is checked to make sure the identification number of the claim matches that of an actual member.

The initial data entry procedure results in generating an open claims record on the corresponding computer file.

The file is batch processed by the com- puter the same night and the claims are distributed to the Blue Cross, Blue Shield, Major Medical, Dental and other claims areas for individual processing on the following day.

Each processor has an individual display terminal and is assigned a daily workload of about 250 claims.

Processing for Indiana's various plans is done by separate, though similar pro- grams. However, because of the compli- cated claims involved, Major Medical processing is performed only partially on-line.

To process a Blue Shield claim, for example, the operator calls up the claim on the display terminal, using the claim number X. The screen displays the initial claims information entered previously on the open claims file.

To help judge and process the claim, the operator can also call on screen displays of existing files — membership, benefit file, history file, etc. By calling the his- tory file, for example, the operator can get a display of the Blue Shield claim history of the member relative to the claim being processed.

Blue Cross has its own processing pro- gram. According to Gary Van Skyock, Blue Cross senior analyst, the operators use their keyboard displays almost like a typewriter to generate telegrams, com- puter letters and other text material.

Split Screen Used

The Blue Cross claims program uses the CRTs to display a current claim on top of the screen, while reference information is shown on the bottom of the same split screen.

This allows the processor to compare displays conveniently without the need for shuttling back and forth between screens. For example, an apparent dupli- cate claim displayed on the bottom half of the screen can be compared with the original claim on the top of the screen — perhaps, for a slightly different spelling of the member's name.

Only authorized personnel can interro- gate the system's numerous on-line files, which are in a coded format. Claims processors or audit clerks can inquire into the same files using the provider identifi- cation number, or they can check on the benefits of a particular contract by inter- rogating the benefit file.

"The installation of the CO:77 displays has been transparent to me," according to Ken Landeck, Blue Shield and Major Medical systems supervisor.

"Except for the fact that we were in- stalling a big plugboard to simplify ter- minal switching at the same time, the changeover would hardly have been no- ticed."

The CO:77s, moreover, are a little easier to read and more pleasing to the eyes, according to Van Skyock.

"The CO:77 tubes have not significantly contributed to downtime," Taylor said, adding he feels they may have done a little better than the IBM displays.

"Service on the CO:77s is much better than it was under IBM and problem reso- lution is much faster," Skyock quoted a user as saying.

Admittedly, the chief initial justifica- tion for replacing the 3270s with CO:77 displays was the lower cost of the Com- puter Optics units. But, "If the CO:77s didn't satisfy our users, they would be out no matter how much money we saved," Landeck said.

Terminal Transactions

ASL Extends Monitor Line

BERLIN, N.J. — Advanced Systems Laboratories, Inc. (ASL) has added two sizes to its line of video monitors designed for alphanumeric applications.

The monitors include the A19 series of 19-in. monitors and the A23 series of 22-in. monitors.

The A19AA prototype costs $160; the A23AA prototype is priced at $190 with delivery in two weeks, ASL said from Route 73, Berlin, N.J. 08009.

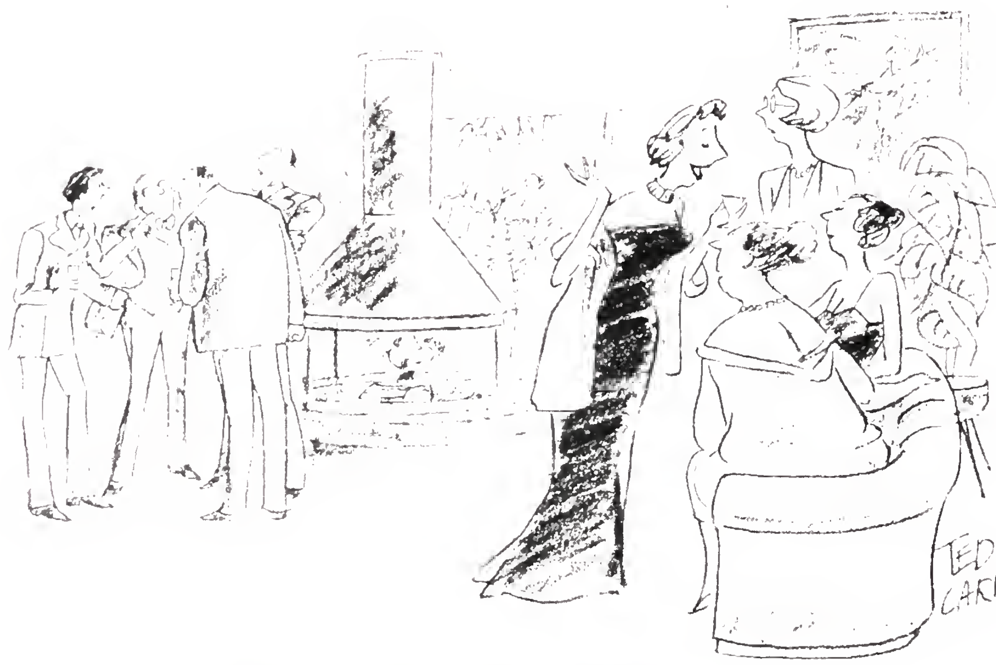
GE Leasing Vadic Units

MOUNTAIN VIEW, Calif. — The Vadic Corp. VA-3400, a full-duplex, 1,200 bit/sec modem, can now be leased through General Electric's (GE) Instrumentation & Communications Equipment Service.

Lease agreements for one month to three years are available, with installation and service provided by GE.

The VA-3400 can provide 1,200 bit/sec operation for users of the GE Terminet line of teleprinters or with other termi- nals.

Lease information is available from Vadic at 505 E. Middlefield Road, Moun- tain View, Calif. 94043.



"Oh, they're all arguing over how Teletype sold 600,000 model 32 and model 33 data terminals."

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In State Department's Early Days

Makeshift Solutions Solve Communications Problems

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The difficulties involved in interfacing a nonstandard message-switching system to the State Department's first IBM 360/40 mainframe produced a variety of makeshift communications solutions in the early days.

However, the problem was finally resolved with Digital Equipment Corp. PDP-11/20 front-end processors, according to Julian Adler, chief of that department's systems design and programming division.

At a user forum held at the Computer Caravan here recently, Adler told attendees the Department of State started with the 360/40 system and used IBM 2701, 2702 and 2703 hard-wired communication controllers for receiving text traffic from posts around the world.

Processing visa applications from foreign citizens who wanted to visit the U.S. was one of the first applications, according to Adler.

Then, as other applications such as personnel records, a document control system and computer payroll were added, the system became saturated, and State soon upgraded to an IBM 360/50. At that time, terminals were limited to slow-speed teletypewriters.

A large document-retrieval system involving receipt and logging of 2,000 documents per day was begun, and response time problems grew.

In 1967 and early '68, users were offered IBM 2703-type terminals, which put a big load on the 50 CPU, Adler explained.

"At the time, we envisioned a system with 100 terminals operating at 2,400 bit/sec, and we wanted to take some of the load off the CPU. But our major concern was software," he recalled.

"We didn't want to write our own nonstandard software and then have IBM change the operating system on us," he explained. Planning time was short, and there was a lot of top-management pressure to get the system going.

At the time the decision was made to acquire new front-end processors, DP officials didn't even know what kind of protocol or what kind of terminals they would be using, he said.

But the choice of DEC PDP-11/20s was easy since in 1972 there was virtually no software available from anyone else but DEC, according to Kathryn Radosh, a State Department systems designer who assisted in the presentation.

Three PDP-11/20s were acquired to interface between the original 360/50 and message-switching software that linked the processor with the department's Computek and Sanders CRT terminals.

The PDP-11/20s were used to generate ACP-127, a nonstandard government communications protocol, and to assure continuity of the text messages coming in through IBM's Administrative Terminal System (ATS). They were also used to convert Ascii to Ebcdic and its segment messages into 2,000-character blocks.

According to Radosh, 50% of the front-end software had to be written in-house. DEC furnished only the operating system for I/O to the peripherals, she said.

The PDP-11/20s looked like IBM 2250 terminals to the CPU, Adler explained.

While this was going on, the CPU had to be upgraded again this time to a 370/158, he said.

Although the communications problems were resolved at that point, additional workload from 200 terminals and a large volume of text messages has resulted in the need to upgrade the front ends again. This time the State Department is getting front ends for their front ends, Adler said.

Three new PDP-11/70s will be acquired. Two will be connected to the CPU with a PDP-11/10 and the third with a PDP-11/20, he explained.

Although the jump seems a bit extraordinary, the actual cost of the 11/70s was not much greater than the much smaller alternatives and will give the department room to grow, he said.

Along the way State Department system designers learned many lessons, Adler said.

First, know your requirement, he said. In deciding on communications gear, one might find that a hard-wired box is just as good as a real front-end processor at a far lower cost, he said.

Second, know what the main CPU interface requirements are. Third, have a clear idea of cost constraints, as well as growth potential.

Fourth, decide whether you really need a fail-safe system, or whether you have some flexibility in mean time to repair.

Fifth, determine what kind of software is available from minicomputer vendors and what the in-house capabilities are, he said.

Tycom Introduces Intelligent Terminal

FAIRFIELD, N.J. – A 10-, 15- and 30 char./sec intelligent terminal for communications, text editing and source data collection has been introduced by Tycom Systems, Corp.

The Tycom Hyterm is Teletype-compatible and can transmit data to or receive data from local or remote terminals or CPUs by means of a built-in RS-232 connection, Tycom said.

The Hyterm, incorporating microprocessor and read-only memory (ROM) integrated circuits, interfaces with a Bell 103A-type data set and is also compatible with other 110- to 300 bit/sec asynchronous modems, a spokesman added.

The system communicates in Ascii code and an Ascii/APL wheel is available at extra cost.

The terminal utilizes the Diablo Hytype II printer mechanism with appropriate software, Tycom said.

The Hyterm is priced at $3,495 with delivery in 60 days, Tycom said from 26 Just Road, Fairfield, N.J. 07006.

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- ☐ Operator oriented
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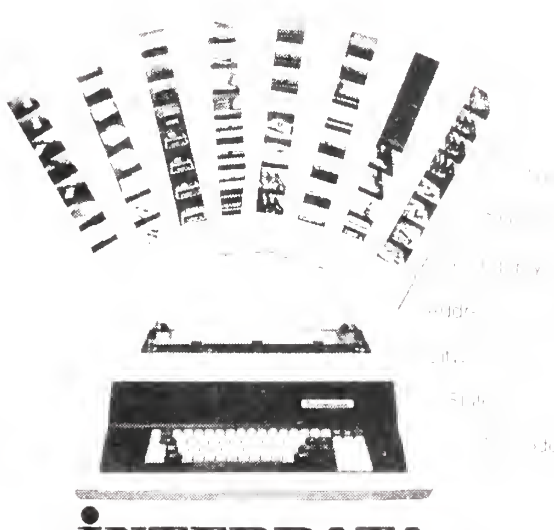

INTERDATA
Subsidiary of PERKIN-ELMER [illegible]
Route 10 and Emery Avenue, Randolph, N.J. [illegible]

See Us at Computer Caravan 76

Firm Cuts Turnaround Time With Distributed System

BOISE, Idaho — A structural wood engineering firm based here has cut information turnaround time with a distributed system of terminals and optical mark readers, according to Kenton D. Reed, its DP manager.

Trus Joist Corp.'s operation uses data and price quotation information and utilizes joist design specifications made at remote stations located in 10 manufacturing plants in the U.S. and Canada.

The company accomplished the shift from manual operations by installing terminals at its plants to communicate with an IBM 370/135 batch-processing system here at company headquarters.

Despite the communications capability of the system, telephone costs proved excessive and operations — even with overnight processing — were limited to an average of 4,000 specification/mo, Reed said.

Each manufacturing plant was restricted to a maximum of six designs per eight-hour day, with turnaround time of 48 hours.

Trus Joist then installed a Hewlett-Packard (HP) Model 2100S minicomputer to act as a front-end processor.

General Electric Co. (GE) Terminet 1200 hard copy terminals operating at 1,200 bit/sec and 12 HP Model 7260 optical mark readers installed at the remote stations were connected to the CPU through Bell 202C modems in the U.S. and Bell 202T modems in the Canadian facilities, Reed said.

With the addition of the optical mark readers, Trus Joist has been able to improve performance in a number of crucial areas, he noted.

The error rate has dropped markedly, eight times the former amount of designs can be processed — and the two-day turnaround time has been reduced to one hour, Reed said.

A cost savings of $2,000/mo was realized by the company because of a changeover from two full-time Wats lines to one timed Wats line during certain periods of use, he said.

The improved performance results were accomplished by placing the readers at each manufacturing plant with associated terminals.

The minicomputer acts as a real-time executive driver of the readers at rates of 120 char./sec, while the hard-copy terminals have been retained as output devices for returning processed data.

In operation, a Trus Joist salesman provides the plant design staff with a client's particular engineering requirements. The design staff converts this information into pencil marks on optical cards and loads them into the mark readers.

The central system, through an automatic telephone dialer on the mini, establishes a link with the reader and transfers the information into the batch computer for processing.

Design inputs of this kind can be performed by several plants simultaneously, Reed explained. Then, as the processed information returns to the remote station via the terminal, the salesman is prepared to develop a bid based upon the estimates of material and labor costs.

In addition to the improved performance and reduced operating costs of the distributed system, a number of other benefits have resulted from the installation, Reed said.

The network permits adding remote stations that can be readily tailored to specific job requirements at a minimum of expense, he said. No training is required for plant personnel and each plant experiences a minimum of disruption during installation, he concluded.

Prentice Adapters Have 10-Mile Range

PALO ALTO, Calif. — Prentice Electronics Corp. has introduced a line of high-speed Limited Range Adapters, synchronous line drivers for phase shift transmission of serial data over two pairs of twisted wires.

The adapters, called P-LRAs, can transmit data up to 10 cable miles, a distance which Prentice said can be increased through the use of appropriate repeaters.

The units do not require DC continuity, although they can be installed on unloaded circuits (metallic continuity) provided by the telephone company in areas where such circuits are tariffed, the company said.

The line's five models operate at switch-selectable rates ranging from 600 bit/sec to 160,000 bit/sec.

All models have an LED interface monitor and loopback switches for on-line trouble shooting. The interface is standard RS-232C or CCITT V.24.

The P-LRAs can be used in half-duplex, simplex or full-duplex transmission modes and were designed as a replacement for the Bell 301/303 data set.

Applications include in-house remote job entry using terminals, remote batch entry, data acquisition, in-house remote cluster of CRTs, and use as a high-speed multiplex channel.

Prices start at $800 from the firm at 795 San Antonio Road, Palo Alto, Calif. 94303.

Centronics Providing Remote Diagnostics

HUDSON, N.H. — Centronics Data Computer Corp. has established a computer-based central diagnostic test center here for its teleprinter and telecommunications interface products.

The Centronics Diagnostic Routines of In-Process Calls (Cedric) system is accessible from all parts of the country via Wats lines, the company said.

The system can be used to diagnose problems, confirm repair procedures and verify proper printer operation at the end of a service call, a spokesman added.

By monitoring the dialogue with the on-site printer, Cedric provides hard-copy output to pinpoint problems with line control, data transmission and reception and signal duration and sequence.

In the printer simulation mode, the system can also converse with the user's CPU to verify that the protocol is compatible with the printer he has purchased or wishes to purchase.

Cedric diagnostic routines can be initiated by users. Details are available from local Centronics offices. The firm is at Route 111, Hudson, N.H. 03051.

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SYSTEMS PERIPHERALS

Bits & Pieces

Enhanced Univac 8430 Drive Expandable to 200M Bytes

BLUE BELL, Pa. — Univac has a version of its 8430 disk drive which it said can be field-upgradable to the higher capacity 8433 disk drive.

The 8430 disk drive was designed for use with Univac 90/30, 90/60 and 90/70 systems and 1100 series computers. The latest version, the 8430-99, can be field-expanded from 100M bytes to 200M bytes in free format, Univac said.

The 8430-99 can be intermixed with existing installed 8430-00 disk drives, and disk packs are read/write-compatible with the 8430-00.

The purchase price for the 8430-00 is $24,960. Monthly rental, including maintenance, is $662. The upgrade feature costs $11,520 and rents for $305/mo. including maintenance.

Univac is at P.O. Box 500, Blue Bell, Pa. 19422.

Versatec Adds Eight Plotters

SANTA CLARA, Calif. — Eight electrostatic plotters from Versatec offer a choice of 22- or 24-in. paper width, vertical plotting speed of 1- or 2 in./sec and resolution of 100- or 200 dot/in.

Four models offer character generator and simultaneous print/plot option for display of captions, legends and other alphanumeric data while plotting.

The electrostatic units plot up to 30 times faster than a pen plotter, the vendor said.

All models use dual-array writing heads to produce an overlapping dot structure for continuous plot lines and a high-contrast image, Versatec said.

Prices range from $13,500 to $22,400. Versatec is at 2805 Bowers Ave., Santa Clara, Calif. 95051.

Posting Has Diskette Housing Unit

BUFFALO, N.Y. — Posting Equipment Corp. has a housing unit for magnetic diskettes called Flexi-Matic which is said to provide protection, easy access and accurate refiling of diskettes.

Further information can be obtained from the distributor, Mead-Hatcher Associates, Inc. at 752 Military Road, Buffalo, N.Y. 14216.

ITC Designs Rugged Cassettes

SUNNYVALE, Calif. — Information Terminals Corp. (ITC) H-Series cassettes are said to be designed for tough industrial and field environments.

The cassettes cost $9 each in quantities of 10 to 49. ITC is located at 323 Soquel Way, Sunnyvale, Calif. 94086.

Downgrades to 360

Firm Cuts Costs With Third-Party Site

By Toni Wiseman
Of the CW Staff

ATLANTA — "There are alternatives in the field. Look around and you may be able to save your company some money — and that's what we're all in the business to do: to make sure data processing doesn't become a drag on our companies."

That statement was made by Tom Braswell, assistant vice-president and director of DP at Genuine Parts Co., at a Computer Caravan workshop here recently.

Genuine has gone to third-party leasing in order to save money, Braswell said. In fact, it third-party leases 98% of its equipment, located in 28 states and Canada.

For a number of years, Genuine was strictly an IBM shop, he said, but when it upgraded to a 370/135, the costs became prohibitive and precipitated a search for an alternative solution.

The alternatives were third-party leasing, dropping back to a smaller system or purchasing, Braswell recalled.

Having decided third-party leasing was the way to go, there were a number of things to consider, including the capability and capacity of a 360 system, maintenance, reliability of the equipment, future enhancement needs and software support, he said.

A close scrutiny of Genuine's operation revealed its biggest problem was being I/O-bound, Braswell said, not CPU-bound, so a 360 could handle its needs. This meant reviewing other alternatives such as disk drives.

A benchmark of several combinations showed Genuine's forward partition work, which was largely a CRT application, took two hours and 35 minutes on a 370/40 with Memorex disk drives, two hours and 34 minutes on a 370/125 with 3330s, 3 hours and 22 minutes on its in-house 370/135 with 2314s and two hours and eight minutes on a 135 with 3330s.

Others tests showed that running on the front and back partitions, the 360 was only two minutes slower than the 125 configuration and 28 minutes slower than the in-house system. It was, however, almost one hour slower than the 135/3330 configuration.

Genuine felt it could live with the 360 time perimeters. Another consideration was the eight- to nine-month lead time on 3330s at that time, Braswell noted.

Third-Party Concerns

Maintenance was a big concern, he said, but Genuine found that even if it went to third-party leasing the IBM field service staff makes "good money" maintaining third-party equipment.

Reliability was another problem, since the primary DP application was an on-line one. "But we've found our uptime is between 98% and 99%. It just hasn't been a problem with the old IBM 360 line.

"We haven't had the advantage of VS and some of the other new IBM announcements and enhancements," Braswell stated, "but our needs have been met so far and we don't feel we've been hurt by not having them."

Genuine was also worried about software support with third-party equipment, particularly since DOS Release 26 was the last release for the 360 line. "But now we're happy that we don't have to begin our system every couple of months."

Leasing companies have also gotten smart in this area, Braswell said. They have gotten together with the Computer Software Co., which sells the Extended DOS (Edos) package, and anyone leasing from some seven companies can get help from it.

"We haven't needed it yet, but it's always nice to know it's there," he said.

"I still think IBM is the finest vendor in the world, but we were forced to go elsewhere," Braswell told Caravan attendees, "and cost was a prime consideration."

Genuine's DP rental costs had risen from $2,100/mo for a 360/20 in 1967 to $14,000/mo for the 370/135, he said. The cost dropped back to $6,900/mo when it leased the 360/40.

Braswell noted a 360/30 with five 2311 disk drives costs $7,000/mo from IBM, the third-party cost is only about $850/mo. The 2314s rent for around $6,000/mo, while compatible Memorex disk drives are $2,400- to $2,800/mo, he said.

Genuine is using plug-compatible disk drives from Memorex and Mohawk Data Systems, Cambridge Memories and CIG core as well as OEM transmission control units and CRTs.

Bottler Attaches 360/50 to 30, Saves More Than Upgrade to 65

LOS ANGELES — "When you find you are running your CPU 24 hours a day, every day of the week, at over 95% of capacity, you look around quickly for some relief," according to John Loudermilk, DP manager at the Coca-Cola Bottling Co. here.

"We had more applications to put on the system and I was already spending over $3,000/mo for additional time outside," he recalled.

The company had a 256K IBM 360/40 running two partitions. Because of the size of the two partitions and spooling on the third, it was out of capacity, Loudermilk said.

IBM proposed a 370/158, but a study Loudermilk made of load demand and costs showed the bottler should replace its 40 with a 65.

"But 65s were becoming scarce," Loudermilk said. "At this time, Randolph Computer proposed we attach a 30 to our 40 to relieve, at a nominal cost, the heavy workload, allowing us more time to make a major shift in system upgrade.

"Randolph introduced us to a software package called Gemini, developed by The Computer Software Co. Gemini allows two CPUs to operate together with significantly improved performance and appeared to be an answer to our immediate need without a large dollar commitment," he said.

The software allowed the 30 to be operated with Coca-Cola of Los Angeles' 40 via a 2841 and a two-channel switch. By attaching five 2311s to the 2841, the user was able to shift spooling I/O to the 30, using the 2311s as a temporary storage area.

"After we installed the leased 64K 360/30, Josh Kahn, Computer Software Co.'s district manager, brought the Gemini software up without any problem. It ran the first time we tried it," Loudermilk said.

"We put all spooling activity out on the 30, and the throughput of the 40 increased 25%. Jobs were running faster simply because the overhead was reduced on the 40, he noted.

The original plan to upgrade to a 65 was scrapped and a Randolph 512K 360/50 was leased to replace the 40 for more core and faster performance. "Now we have plenty of growth potential. For example, with The Computer Software Co.'s Extended DOS package, we can increase the number of partitions to six now.

"The utilization of the 50 is currently at 62%. Although we still must run three shifts due to scheduling, we have eliminated weekend and all outside processing," he said.

"Now we have two printers on the 30 plus a 1287 optical reader, which runs in background. Six RCC 7330s from Randolph have just been installed to replace the 2314. These 100M-byte, 3330-type drives will give us additional throughput."

And throughput is vital to rapid operational expansion, Loudermilk said.

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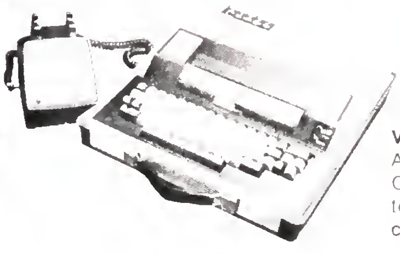

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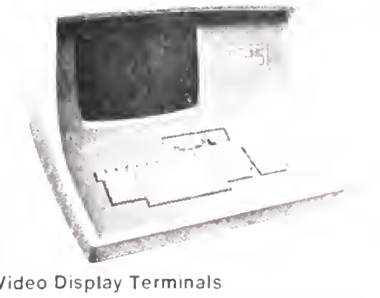

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Fields Seen Integrating

DP, Microfilm Communities Require Cross-Training

By Dennis Neary

Special to Computerworld

The need for cross-training between the data processing and micrographics communities has [illegible] major [illegible] the two [illegible].

A [illegible] course will [illegible] National Micrographics Association meeting in Chicago. This will be followed a month later by a microfilm seminar at the National Computer Conference.

This is a good start. Executives seeking increased effectiveness from their information-handling operations should encourage such cross-training efforts at both the national and local levels.

Changes in data processing over the next five years will make the microimage more valuable to computer users. Recent developments have shown that enormous [illegible] is possible through [illegible] of the two media.

Micrographics and DP Today

Large computer operations save substantial time and money by printing data onto film instead of paper. Computer output microfilm (COM) is used to update data bases and process transactions at a fraction of the cost of impact printing.

Microfilm and computers have proved to be an excellent combinations for storing, retrieving and updating all kinds of information. To make it easy to retrieve microimages, an address is sometimes kept in the data base that reflects all transactions recorded on microfilm. On-line interactive systems can be used to assist in retrieving microimages.

There is a trend to film source documents in random order and simultaneously assign them a sequential roll and image number. This number, another element of collected data, is stored in the data base or is processed and incorporated into an output report.

Microfilm and data capture is presently a two-step operation. Although high-speed scanners are now available with a microfilm camera option, by 1980 we can expect devices that will simultaneously capture the data for the mainframe and also capture the document on a microimage. The data and the document will be connected by the film's sequential number.

The most convincing reasons for integration of microfilm and the computer resides in the evolutionary history of the data processing industry.

The extensive data bases of the future will need a place to store source documents, archival records and reports of processed transactions. We expect that the microimage will play an extremely important part in meeting that need.

COMmentary

By 1980 the industry should have a new generation of mainframes that contain millions of bytes of MOS internal storage and billions of bytes of auxiliary disk storage.

The industry will strive toward the concept of one massive integrated data base that will be maintained on-line to support a variety of batch tasks as well as interactive inquiry.

The growth of microprocessor technology will foster more intelligent terminals that will allow more users to readily interact with the data bases. Data collection techniques will improve as flexible diskettes, optical scanners and electronic funds transfer techniques mature.

Processing capability will be distributed to decentralized offices for convenience, improved service and reduced operating expense.

Telecommunications is a key to successful disbursement of massive computer power. Technological advances involving packet network switching promise to cut the cost of data transmission in half. Inconsistencies that have impeded the progress of telecommunications will be resolved.

Companies will introduce equipment that interfaces computer terminals with microfilm retrieval devices. These terminals will, in turn, be connected to mainframes, minicomputers or time-sharing devices.

Integrated devices that combine the functions of the terminal and microfilm reader should evolve. Data capture microfilmers should be a reality by 1980.

The most significant challenge will occur in the areas of system design, software and file maintenance. Software will be required to generate screen formats to make the terminal easy to use for data collection and retrieval.

Because of the size of the average file, new techniques will be required to pack millions of characters into a minimum amount of storage. As these challenges are met, computer-assisted microimage retrieval systems will flourish.

COM will continue to adapt to the computer environment, providing more convenient output with reduced cost, resulting from new technology.

The computer and microfilm industries need mutual understanding: they should complement, not compete, with one another.

That is why there is a need for cross-training of individuals from both the data processing and microfilm industries. This training in the form of seminars, lectures, formal curricula and correspondence-type courses can be provided by various DP and micrographic vendors.

Work done so far in this area has been well received. What remains now is for large DP organizations, micrographics departments, local associations and national trade organizations to take advantage of these opportunities.

Neary is marketing coordinator of automated microimage retrieval equipment for Eastman Kodak Co.'s Business Systems Markets Division.

Firm Increases Capacity With Independent Memory

By a CW Staff Writer

RICHMOND, Va. — When IBM was reluctant to lease this firm an add-on memory for its 370/145, Systems Engineering Corp. (SEC) here obtained 256K bytes of add-on memory from an independent manufacturer.

"We owned the 145 and IBM preferred not to lease us additional memory," Robert Trevvett, operations supervisor, said. Another reason SEC went to an independent was the cost savings, he continued.

SEC runs primarily teleprocessing applications with additional batch operations for payroll, credit unions and insurance firms in the area.

An increase in the number of telecommunications applications caused the firm to seek additional memory. The company is also planning to add another CPU because of increased workload, Trevvett said.

"We were running at 100% of machine capacity in evening shifts," Jim Carr, senior vice-president, explained. "But we had additional requirements to service our expanding teleprocessing business. Without the add-on memory, the system would have required excessive paging," he added.

The system experienced considerable downtime while the memory was being installed, Trevvett said. The system was installed in two phrases by Memorex Corp., the memory vendor.

The first phase established a shared-port feature that allowed the mixture of IBM and Memorex memory on the same CPU port, Memorex said. This took "30 to 40 hours to put in," Trevvett said.

The second stage, which involved the actual installation of the Memorex box, took about 20 hours of downtime, Trevvett said.

Benefits from the independent memory include greater capacity and increased throughput, he continued. The memory cost SEC about 40% less than a comparable IBM memory, a Memorex spokesman said.

The installation at SEC includes 256K of Memorex MOS memory and 784K of IBM core memory. A select switch, included as part of the add-on memory, allows running of the CPU either with IBM memory only or with both IBM and Memorex memory, Memorex said.

The configuration at SEC includes the 370/145, 14 3330 disk drives, eight 2401 and three 3420 tape drives, two printers, a card reader and a front-end device.

An additional 370/145, printer and card reader will be added to the system shortly, and the CPUs will be sharing the disk and tape drives, Trevvett said.

The memory and shared-port feature are "holding up well," Trevvett added.

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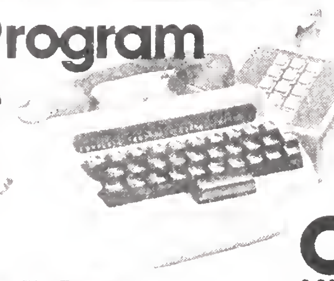

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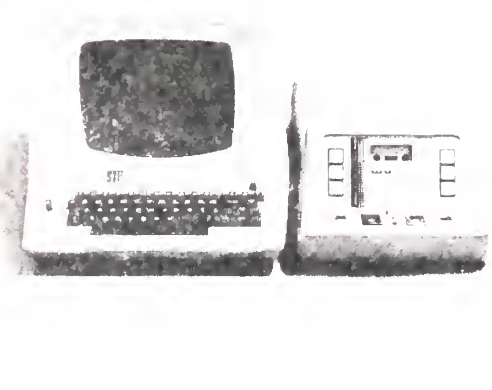

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MINIWORLD

Wang Offers End Users Portable Unit, Workstations

By Esther Surden
Of the CW Staff

NEW YORK – Spanning a range between a portable IBM 5100-type unit at the lower end of the line and a workstation configuration at the top of the line, Wang Laboratories, Inc. introduced a passel of products for small-business applications here recently.

Designed for distributed processing and small applications, the 2200 PCS portable system includes a 2200 CPU with 8K bytes of random-access memory and 42.5K bytes of read-only memory, a 9-in. CRT with alphanumeric keyboard and a tape cassette for data storage and program loading, the firm said.

The 55-lb. system uses Wang's Extended Basic and is upwardly compatible with previous Wang offerings, a spokesman said. Memory is expandable to 32K, he added, and the basic system costs $5,400.

The smallest 5100 configuration includes 16K and Basic and costs $8,975, an IBM spokesman said. The IBM model is available with APL too, however, he noted. A comparable 16K Wang system which runs Basic only costs $7,000, a Wang spokesman said.

Handles Four Jobs

With the Model 2200WS workstation, the Series 2200 computer with 5M-byte or 10M-byte disk attached can process up to four jobs simultaneously, the firm said. The workstation includes 8K bytes of semiconductor memory expandable to 32K, a 12-in. CRT, keyboard, disk multiplexer interface and connector. The unit costs $4,900, a spokesman said.

The 2200 PCS and the workstation are built around a lower cost Series 2200 processor, which is a general-purpose CPU with 1.6-msec memory cycle speed, the company said.

The Model 2272 virtual drum plotter is a microprocessor-based unit with a nonrotating drum, a spokesman said. The plotter moves the paper, he added.

The Intel 8080 controlled system generates an alphabetical character set for labeling plots, relieving the processor of that function and also controlling the stepping motors, he noted. The unit can be used with the 2200 PCS as well as the rest of the Wang line and costs $2,900, Wang said.

A 120 char/sec serial matrix printer designed to fill the gap between low- and medium-speed devices, was also announced.

Dubbed the 2231W, the unit can print from 40- to 250 line/min depending on line length, is 112 columns wide and prints the 96-char. Ascii set, the vendor said. The unit uses a 7 by 9 dot matrix and allows bottom feed of the paper, a spokesman said. It costs $2,900.

A diskette-based turnkey minicomputer system using the firm's Series 2200 is called Wang/Cash and is designed for bookkeeping and accounting applications, Wang said. The system includes the CPU with 16K bytes of semiconductor memory, a 9-in. CRT and keyboard console modified to conform with an add punch format.

A dual diskette system with 524K bytes of storage and a 200 char/sec printer is also included in the system cost of $25,800.

A Wang/Cash user would first set up his chart of accounts which would determine the format of the printed reports to follow, a spokesman said. The system will prepare journal audit lists, financial statements, payroll compensation reports, quarterly payroll tax reports, W2 forms, statements of change in financial position, working trial balances and detailed general ledger reports, the firm said.

A software system called Management Planning System (MPS) allows financial planners and other business managers to make future projections based on historical data, a spokesman said. The package costs $200.

Three system enhancements including two microprocessor-based communica-

(Continued on Page 37)

Wang 2200 PCS and 2270 Virtual Drum Plotter

Wins Bill Disputes

Energy Management Saves Firm $602,000/Year

By Esther Surden
Of the CW Staff

ATLANTA – A power management minicomputer system for a chain of department stores here has realized the firm an "annualized savings totaling $602,000 per year," the user said.

The system is in operation at Rich's, Inc., a chain of full-line and discount stores in Georgia, North Carolina and Alabama, according to Marshall N. Sauls, vice-president for management and development.

"The power management system provides a written record of actual demand at each monitored facility," Saul said.

"With 24 facilities spread over a three-state area, and all connected by means of a voice-grade telephone network, we have the basis to enter into man-to-man discussions with our friendly power company anytime the billing appears to be out of line," he said.

"We have had remarkable success in obtaining rebates on several occasions when billing was, in fact, in error because of metering problems," he said. Checks ranging up to $22,000 have resulted, he added.

Realizing that its consumption of electric energy was increasing at almost a predictable rate in 1972, the firm decided to try to save money by implementing a power control system, Sauls said.

After discussing the power problem with many vendors, Rich's implemented a system based on an IBM 7 minicomputer. The system cost between $150,000 and $175,000 and was amortized over a period of the first seven months of operation.

Rich's talked to RCA and smaller companies with load-limiting systems. "We also conducted in-depth discussions with Honeywell," which at the time didn't seem to have a system to fit Rich's needs, Sauls said.

"The point is that everyone talks demand-limiting systems, but in reality there are very few that have a system that differs very much from time clocks," he said.

In addition, the IBM system allows the firm to have unattended operation, he said.

Commercial and industrial customers have a demand meter as well as a kilowatt hour meter, Sauls explained. At the end of each demand interval, usually 15 or 30 minutes, a new measurement takes place.

The user can get the most energy per dollar if the load can be kept constant, and "the key to power management is to find a way to level out the peaks and valleys of demand and energy consumption," he said.

There are two major load categories, Sauls said. Constant loads include most lighting, elevators, escalators, etc., and interruptible loads are those such as heating, air conditioning, fans and pumps.

Wired to Meters

Not only does the system control the fans, compressors, pumps and other items that can be periodically cycled back when demand goes up to unacceptable levels, but the system is physically wired to the energy company's metering equipment installed in the facility, Sauls said.

Remote terminals are connected to means of small-gauge, low-voltage cabling to the equipment to be controlled, he said. All the remote terminals are operated over a voice-grade telephone network.

A 30-day recording demand meter record enables the firm to identify the highest level of demand that was recorded for each facility, he said.

The system polls each facility every two minutes and can spot if something has not been turned off, Sauls said. A copyrighted floating standard target technique, developed by Rich's, allows the standard to float up or down to the level where the previous demand interval is completed.

Thus the system continually seeks to improve the productivity for each facil-

(Continued on Page 37)

Prime Unveils Packaged Systems

FRAMINGHAM, Mass. – Prime Computer, Inc. has announced packaged systems designed for computational and time-sharing users built around their Tempus family of processors.

Create/2 is an eight-user system including a Model 300 CPU with 64K bytes of MOS memory, floating-point arithmetic, 30 char./sec operator terminal, 6M-byte disk drive and a communications controller for up to eight asynchronous lines. System software is the Primos III virtual memory operating system, the firm said. Create/2 costs $36,000.

Create/3, a 16-user system, incudes the Model 300 CPU with 128K bytes of memory. It is also equipped with floating-point arithmetic, a 30 char./sec operator terminal, 12M-byte disk, 9-track 800 bit/in. magnetic tape drive, and 165 char./sec printer and communications controller for 16 asynchronous lines.

The package sells for $67,300 including Primos III.

Create/4 is a 16-user system that includes the Prime Model 400, 256K bytes of memory and 2K bytes of bipolar cache. The package includes floating point, the operator terminal, 80M-byte disk, a 9-track 800 bit/in. drive, a 300 line/min printer and a communication controller for 16 asynchronous lines.

The software for this package includes the Primos IV operating system introduced with the 400 this year [CW, Feb. 2] and costs $130,000, Prime said.

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Guitar Maker Plucks Own System From OEMs' Shelves

By Esther Surden
Of the CW Staff

SANTA ANA, Calif. – When the mini vendors couldn't come up with the right combination for an electric guitar manufacturer's business, the firm decided to put together its own time-sharing system.

"I was disgusted with what the manufacturers could put together for me," John Hall, the Rickenbacker Co. DP manager said, "and I must have talked to 40 different companies.

"Some tried to oversell us, some to undersell us," Hall said. So he decided to develop his own system, even though he was told "it couldn't be done."

Hall, who is the son of the company's president, had courses in computer science in college in conjunction with his art degree. By his own admission, it took "a lot of reading and talking to people" to bring him to the point where he could begin to configure his own system.

When Hall first began putting together the system, he defined the specifications for a general configuration that provided what the firm needed. "It was very obvious to me everyone was using everyone else's peripherals in building their systems," Hall said, adding that, when he went to the OEMs, the companies were generally cooperative about selling in single-unit quantities.

Mixed Configuration

The configuration at Rickenbacker includes a Digital Computer Controls DCC 116E minicomputer with 32K of Keronix, Inc. add-on memory, a Centronics Data Computer Corp. printer, a Model 33 ASR Teletype, two Beehive Medical Electronics, Inc. Minibee II CRTs and an Educational Data Systems EDS-8 multiplexer. EDS provided the system software as well, Hall said.

Hall chose EDS' Iris operating system because it seemed to best fit the definition of a time-sharing operating system designed from the viewpoint of the user, he said.

The total system, including software, cost Rickenbacker about $25,000, a price Hall termed "quite economical."

Established Data Base

The firm has established a complete data base for its operations and has written numerous time-shared programs including order entry, dealer control, consumer mailing lists, and inventory invoicing and accounts receivable, written in Iris Business Basic.

The DMA Channel Multiplexer from EDS allows the CPU to handle a number of terminals with "only a light I/O processing load on the computer," Hall said.

Having received positive results from its home-grown time-sharing system, Rickenbacker is continuing to develop programs for other areas, including traditional accounting and engineering.

The engineering programs are playing an important part in Rickenbacker's designs for the electric guitars it manufactures, Hall said.

The company has also decided to solicit outside customers to use the time-sharing system. "We are going to make it a money-making tool rather than just an overhead cost," Hall said.

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See DASL at COMPDESIGN/76 in Chicago, April 13-15

Vanguard Mini For Business DP

VAN NUYS, Calif. – The Vanguard Computer Systems, Inc. V500 system was designed for order entry, inventory control, on-line invoicing, personnel, payroll and other general business applications.

The system features a 700 nsec memory speed, 131K-byte CPU memory, 16 levels of hardware priority interrupt, up to 64 multiplexed subchannels and common bus architecture, the firm said.

Software for the system includes a multiprogramming, terminal-oriented operating system that executes a variable number of concurrent batch or on-line tasks, it noted.

Operating system features include dynamic disk space and memory allocation, priority job scheduling, print output spooling, job accounting, file cataloging and standard file access methods, a spokesman said.

A typical 65K configuration with 52M bytes of disk, 300 line/min printer, six CRTs and two serial printers costs $94,400. Monthly maintenance is $708 from the firm at Suite N, 7417 Van Nuys Blvd., Van Nuys, Calif. 91405.

Southwest Has Line For Basic Four Users

NEWPORT BEACH, Calif. – Southwest Data Systems is offering a number of products for Basic Four users, the firm said.

Among the products are a disk pack for $120; a 300 line/min printer with expanded print, full forms control and six-part forms capability for $7,500; and an 8K core memory board for $2,950, Southwest said.

The firm can be reached at Suite 111, 4121 Westerly Place, Newport Beach, Calif. 92660.

Keeps Parishioners' Tax Records

Bureau Buffers Churches' Bookkeeping Headaches

By Nancy French
Of the CW Staff

LYNCHBURG, Va. – A service bureau here is using a minicomputer to help some 15 churches out of their bookkeeping quagmire and to aid parishioners in keeping accurate records for the tax man.

Genesis Systems, Inc. uses a Burroughs Corp. B700 computer system to process contributions, send quarterly and annual statements to church members and perform general mailing services, such as printing labels and personalized letters.

In business since last July, Jerry L. Snively is a student at the Liberty Baptist Seminary here, when he isn't acting as president, programmer, systems analyst and general manager of Genesis.

Business has grown steadily since July, and Sinvely now has 32 accounts. By next year, he may need a bigger machine that can do some interactive processing, and Snively is thinking about the B1700, he said. For now, however, the B700 suits his needs just fine, he added.

Snively chose the B700 because of what he thinks is a superior cost/throughput ratio.

Although IBM, Burroughs and NCR all can provide equally good maintenance service in this small community, Snively failed to consider either IBM or NCR "because of cost," he said.

"I'm very familiar with IBM's 3," he said; "it's a fine machine, but we're in the $1,000/mo. category, and the 3 would have cost us twice that much for very little more throughput than we're getting with the 700," he said.

He also looked at Datapoint's minicomputer system, but felt the B700 gives "so much more for the same price," he said.

The CPU has 40K bytes, the disk drives give him 4.6M bytes of secondary storage, and the PC-930 card reader/punch, which can be used both off-line and on-line, is a superior input system, Snively said.

Finally, the B9249 line printer prints at 160 line/min – faster than the 30 char./sec Diablo Servo printer that comes with the Datapoint equipment, he added.

In addition, when he was looking at systems, the Datapoint machine offered its own language, not Cobol, which Snively felt was a requirement for his processing needs.

Keeps Track of Contributions

The major portion of Snively's church data processing is concerned with contributions.

Every Sunday the churches' clerk/bookkeeper opens the numbered envelopes provided to each church member for use in making contributions, tallies up the collection and turns over the envelopes to Genesis.

There the member's number and contribution amount is keypunched and, at the end of the month, processed in batch mode.

Every quarter, statements are run off with a copy for the contributor and a copy for the minister.

At the end of the year, a statement is prepared for the [illegible] tax return.

The service bureau approach is not appropriate for all churches, he pointed out. Some very small churches [illegible] be able to handle the job with one bookkeeper, he said.

However, once a church gets as large as 500 contributors, two full-time clerk/bookkeepers would be needed to process this manually. Envelopes would have to be emptied, sorted and posted to ledger accounts. Then statements would have to be typed and sent out – a very time-consuming job.

Using a service bureau, the 500-contributor church can eliminate the need for a second bookkeeper at considerable savings, he said.

Wang Portable Unit, Workstations Bow

(Continued from Page 35)

tions controllers that formally bring communications to the Wang systems and a large-capacity 12-in. CRT were also part of the Wang announcement. Communications was previously available as a courtesy to Wang customers only, a spokesman said.

The Model 2228, an Intel 8080 microprocessor-based binary synchronous module, plugs into the 2200 system and allows the CPUs to communicate with IBM 2780 and 3780 remote batch terminals or the IBM 3741 data entry terminal, a spokesman added. The 2228 costs $2,500.

Model 2227B is an asynchronous communications controller module that permits the CPU to be attached to a Teletype or Burroughs Corp. TC-500 terminal, he continued.

Data rates up to 4,800 bit/sec can be accommodated. The 2227B costs $1,000.

The large-capacity 12-in. screen introduced for the workstations costs $2,200, $400 more than the 9-in. screen available with the systems, Wang said from 836 North St., Tewksbury, Mass. 01876.

Energy Management Cuts Firm's Costs

(Continued from Page 35)

ity, he said.

As a follow-on to power management, Rich's has developed and implemented a proprietary security system using the 7, Sauls said. The firm developed a premise station or terminal, installed at the branch facilities and connected to security devices throughout the stores, he continued.

This system has enabled Rich's to eliminate the charges for central station security and at the same time "to ascertain whether the animal that ran across the floor was a rat or a mouse," Sauls said.

The system has also enabled Rich's to reduce the number of guards needed to patrol the stores.

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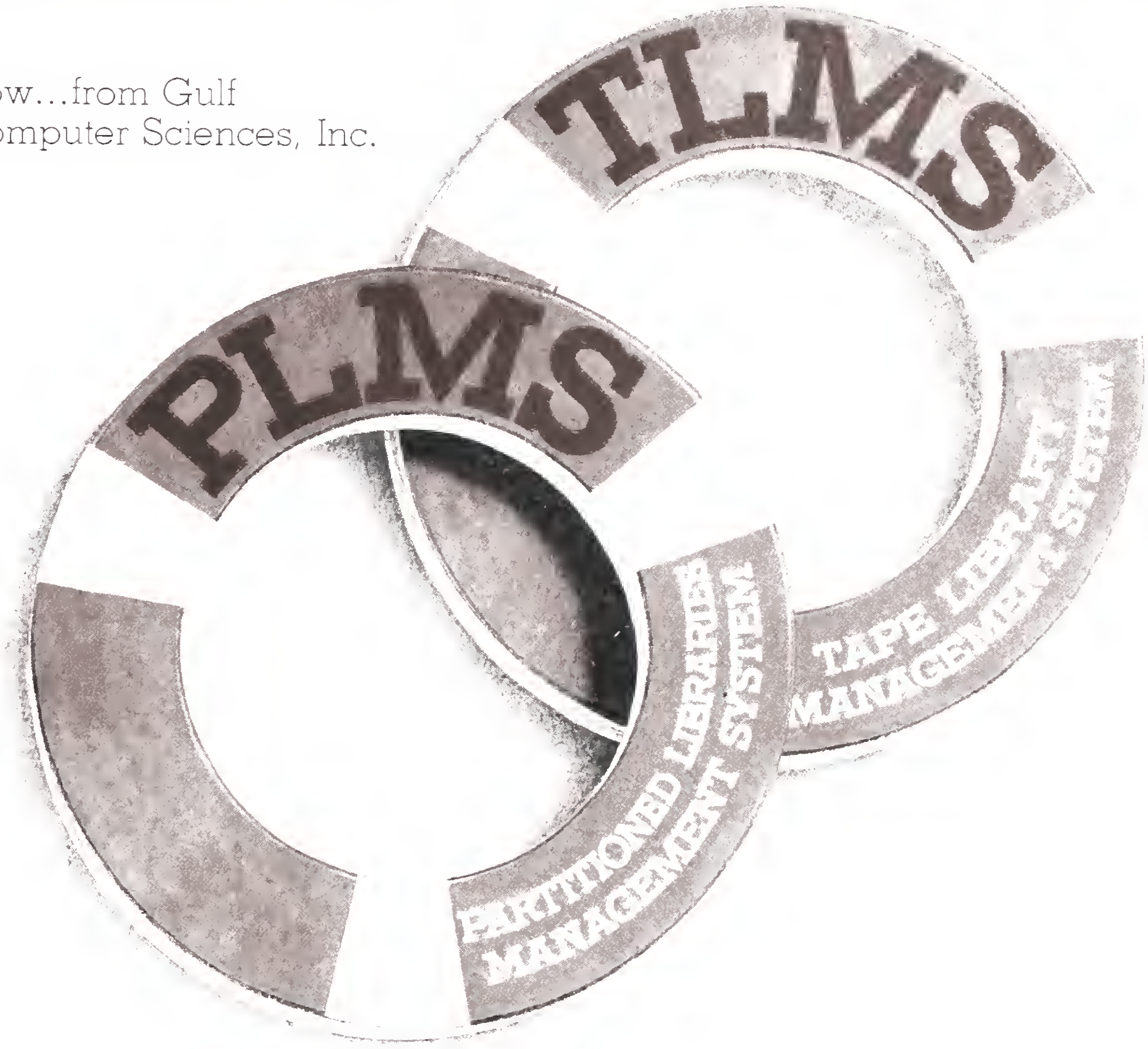

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RCA

For Boiler Manufacturer

T/S Tryout Leads to Purchase of Mini

Special to Computerworld

MARYLAND HEIGHTS, Mo. — Renting computer time is a good idea until the application proves itself — then it's time to buy, a spokesman for Brasch Manufacturing Co. said.

The custom electric duct heater and electric boiler firm here recently purchased and installed its own time-sharing minicomputer system.

"Purchasing has some significant advantages when you know what you want to do," according to Jerry Brasch, the company's president. "And instead of limiting the time on the system to avoid extra expense, you push the system for maximum output, just as you would any other capital investment."

Bernie Myers, Brasch's DP manager, explained the reason for a time-sharing minicomputer system: "We avoid the time delays common in large computer batch mode operation by using four terminals on the system simultaneously. It's working so well we'll soon add a fifth terminal."

"For our customers, we design and deliver custom duct heating units as large as 480 in. by 180 in. and from 200 watts up to 2000 kilowatts. We just input parameters such as width, height, voltage, and watts and the mini takes it from there.

"Besides that, a time-sharing system allows us to do our payroll while simultaneously processing orders and doing material control work. We don't have to wait until the system is free from other duties before we start new tasks.

"We can even develop new programs at the same time as daily work is being processed," Myers said.

Reason for Choice

Brasch purchased its 4000/10 system from Basic Timesharing, Inc. (BTI) because it was less expensive in the long run, provided better operational control and assured privacy of proprietary programs, Myers said.

The firm had been using a time-sharing service and programming in Basic before obtaining its own system. A prime consideration in choosing another system was the ability to keep the programs the firm had already developed on the time-sharing service.

This meant an adequate Basic language was necessary, Myers said. "We were mainly looking for a time-sharing system; we didn't want to go to batch," he added.

The firm looked "at all the popular makers on the market" including Digital Equipment Corp., Hewlett-Packard, General Automation, Honeywell and IBM.

Price was definitely a factor in deciding on the BTI system, Myers said, explaining that vendor's system came in at a lower figure than the others.

The configuration at Brasch includes the BTI 4000/10 with 64K bytes of core, two 25-byte disk drives and 16 ports. The system cost $55,500 when purchased in September from BTI, Brasch said.

Four teletypewriter terminals are used with the system; a CRT is to be added shortly, Myers said.

Reports Daily Changes

The mini reports daily changes in sales volume which schedule incoming orders. The reports are detailed by sales representative and product category.

Custom heater price schedules are maintained for Brasch's OEM customers, according to Myers. These may be updated item by item, in groups of items or as entire schedules by either a dollar amount or percentage, he said.

Updated schedules can be printed in a form ready for copying and distribution. Edit programs check order entries for correctness and provide correct list and discount price for duct heater orders.

"Using information from the Edit programs," Myers said, "other programs called specification programs calculate current, resistance and other information and select components to be used in custom heaters."

As programmed by Brasch, the system prints output pages giving flat pattern sheet metal dimensions for frame and terminal box pieces, notching instructions and proper gauge selection. This is a direct production aid given to a shear operator as a cutting note.

Engineering specifications are printed for each different unit on each order and accompany the units through the factory.

On stock heaters, this procedure is refined so no additional engineering is required for stock units, except the preparation of a wiring diagram. For custom units, where the mini is unable to complete the specification, an engineer finishes the details of the order.

Cost calculations may also be printed for each order. Here the metal, wire and components used in a unit are cross-referenced to the inventory file where current prices are obtained, and a material cost for the unit is prepared and printed.

"Inventory control on raw materials and purchased parts extends into all product categories," Myers said. "Our material control package on the system permits on-line entry of requirements, orders, receipts and physical parts counts, as well as price and vendor changes."

Average use and minimum stock levels are calculated by the system and are projected to anticipate shortages. Another program prints inventory levels, the value of each item and a summary showing the total inventory value and value of parts on order.

Datapoint-Based Turnkey Designed For Insurance Firms by Pinkerton

WARMINSTER, Pa. — A turnkey minicomputer system based on the Datapoint Corp. 5500 and designed for business applications in insurance and brokerage firms is available from Pinkerton Computer Consultants, Inc.

The Broker-Agency Financial Information System (BAFS) was designed to help single or multi-office insurance brokerages and agencies control receivables, payables, payroll, general ledger and other financial applications, Pinkerton said.

The system establishes and maintains a data base of financial records which reflects all receivables and payables at a transaction level, the vendor said.

The data base can be updated daily via remote terminal with communications capabilities, a spokesman added.

The system, which includes the Datapoint 5500, two disk drives, a 300 line/min printer and an additional CRT costs $106,000, including all hardware and software, the spokesman said from 65 West St. Road, Warminster, Pa. 18974.

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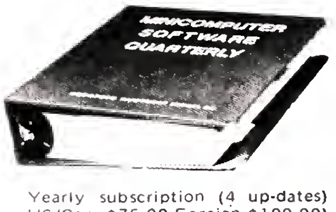

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COMPUTER INDUSTRY

U.S. vs. IBM Trial Hears

Xerox Told in '72 Not to Expect Big DP Profitability

By Edith Holmes
Of the CW Staff

NEW YORK – A computer strategy task force determined in 1972 that Xerox Corp. should abandon any major marketing effort in business DP and refocus its attention on its traditional scientific-oriented applications, a Xerox executive said recently at the U.S. vs. IBM antitrust trial here.

In addition, the task force decided Xerox should face up to the fact Xerox Data Systems (XDS), known since early 1974 as the Data Systems Division (DSD), would never be a significant factor in the computer business, according to Rigdon Currie, who is currently director of special businesses for Xerox's corporate staff.

"The Xerox computer business could be made profitable," Currie stated. "But never very profitable." He recalled the task force concluded Xerox could "get into the mainstream or at least a larger tributary" of the computer industry only through acquisition.

Currie added he believed Burroughs to be the best candidate for acquisition by Xerox, but also thought the healthy price/earnings ratio of the company relative to that of Xerox would make it too expensive.

Without acquisition of some healthy computer operation, Xerox would have had to make "substantial investments in product research, manufacturing and marketing," he stated.

In general, he suggested, $400 million to $500 million in revenues is necessary if a company is to compete as a major factor in the marketplace.

But the task force had determined "only a limited portion of the computer operation was necessary to Xerox's principle strategic needs in its business office."

The company was ready to shift the bulk of its computer resources into its other businesses, Currie indicated.

Basis for Measurement

Currie testified the task force report "became the basis from which Xerox measured and directed its computer operation." He noted, however, the team's study and its report were not considered by Xerox at the time to be a prelude to the company's withdrawal from the industry last summer [CW, July 30].

In 1972 Xerox firmly believed it could stay in the computer business on a limited basis and achieve that margin of success, Currie said.

In line with the recommendations of the task force, Xerox did scale down its efforts in the industry, terminating its developmental operating system, XOS, and completing only some advanced technology work on the Xerox 530, 550 and 560 computer systems, among other things.

Currie was alternately in charge of the field sales force and headquarters marketing support for XDS until he became vice-president of the Data Processing Division with responsibility for both those functions in January 1971.

In May of 1972 he was made manager of systems marketing on the corporate marketing staff. Currie said he continued to spend 15% to 20% of his time on Xerox's domestic computer business and, since June 1975, has been involved in assisting Xerox in its exit from the industry.

Harvey Cohen, now president and chief executive officer of International Communications Sciences but once senior marketing vice-president of the Computer Systems Division of Xerox, and Jack King, [illegible] formerly responsible [illegible] Xerox systems of Xerox DP operations and later of customer installation [illegible] also took the stand recently.

At the time Xerox acquired Scientific Data Systems (SDS) in May 1969, the company had hopes of being number two in the industry, second only to IBM, Currie and Cohen both told the court.

(Continued on Page 40)

IBM Sabotaged Own Plans for Next Generation By Locking Customers Into 360/370: Amdahl

By Jeff Herrmann
Special to Computerworld

CAMBRIDGE, Mass. – IBM's success at locking customers into the 360/370 series has disrupted its plans for the next generation, according to Gene Amdahl, chairman of the board of Amdahl Corp.

Amdahl estimated about $200 billion has been spent by IBM 360/370 users on computing applications.

While this investment has made it difficult for competitors to intrude into the market for large commercial systems, it is now becoming a "monster" which IBM itself can no longer control at will, he said recently at the Massachusetts Institute of Technology here.

Customer transitions from the older OS-based systems to the newer virtual storage systems (VS) has been proceeding too slowly – at perhaps only one-third the rate necessary to make the next generation, the "Future System" (FS), a viable product as originally planned, he said.

Amdahl attributed delays in the release of the new IBM generation to both the wait for users to complete the transition [illegible] the past.

Transition Problems

IBM is stuck with the [illegible]

[illegible] future.

He credited the importance of these areas to significant improvements in communications and storage system technologies and said he thinks they will receive the most attention from IBM in the near future.

Storage technology received particular scrutiny from Amdahl, who commented that while magnetic bubble technology is on the verge of commercialization, especially by IBM, electron beam memories should provide tough competition.

Charge-coupled devices, once thought to be the next major storage technology, are now not as promising as bubble memories, he said.

Amdahl markets the 470V/6, a mainframe which is software-compatible with the 370/168, but is said to offer cost performance advantages through the use of LSI technology.

Amdahl users run standard IBM software under license. The 360/370 operating systems were placed in the public domain when IBM unbundled in 1969, he said.

Amdahl was chief architect of the IBM 360 series before leaving IBM to found his own company in 1970.

Milgo/ICC vs. AT&T Readying

MIAMI – Leading off one round of the suits pending between Milgo Electronic Corp. and International Communications Corp. (ICC) vs. Western Electric Co. and AT&T will be Milgo and ICC's charge that Western Electric and AT&T violated the 1956 consent decree by patent misuse.

Judge C. Clyde Atkins of the U.S. District Court for the Southern District of Florida has put on ice the issues of whether Milgo/ICC's modem patents are valid and whether they infringe on Western Electric's patents.

The scrap between the two parties started in 1974 when Western Electric and AT&T files a patent infringement suit against Milgo/ICC.

The Florida firms countered by charging that Western Electric and AT&T use improper licensing practices that violate an existing consent decree requiring Western Electric to license its patents to all licensees at nondiscriminatory royalty rates [CW, Feb. 12, 1975]. Milgo/ICC termed this "patent misuse."

It is the latter issue that the court will hear first, in a trial, rather than summary judgment as Milgo/ICC had requested.

The judge indicated that if Milgo/ICC prove their claims of misuse on the part of Western Electric and AT&T, the suit by Western Electric and AT&T could not continue.

Trial will be scheduled in about six months, he said.

In a more recent action between the two sets of parties, Milgo filed a patent infringement suit against Boeing Computer Services, AT&T and Western Electric in which it alleged AT&T modems No. 208 and 209, made by Western Electric, infringe Milgo's patents [CW, Feb. 2].

Milgo is also involved in an action with Codex Corp. over patents. Milgo filed a declaratory relief suit against Codex asking the court to declare the Codex patent invalid and noninfringed.

Milgo also filed a suit against Yellow Freight Systems, Inc., a user of Codex modems.

These actions occurred after Codex asked that Milgo cease marketing certain modems it said infringed on a recently issued Codex patent.

Codex later followed that up with charges of patent infringement in a suit filed against Milgo/ICC [CW, March 15] and joined with Yellow Freight in filing for delaratory relief with respect to the patents involved in the earlier suit filed by Milgo.

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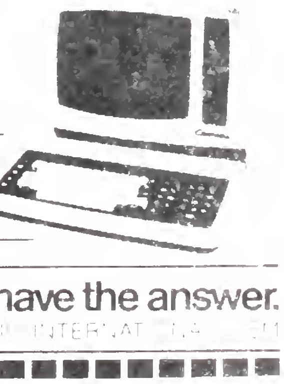

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Decsystem-10 Price Cuts in '72 Hurt Sigmas: Currie

By Edith Holmes
Of the CW Staff

NEW YORK — Digital Equipment Corp.'s 1972 price reductions of 10% to 15% on its Decsystem-10 processors directly impacted the competitive effectiveness of members of Xerox Data Systems' (XDS) Sigma line, a Xerox executive said recently at the U.S. vs. IBM trial here.

Rigdon Currie said XDS also faced delays in the announcements of new products. While the company had plans to be number two in the computer industry (see related story on Page 39), it never moved to seriously implement those intentions through hardware and software development schemes, he stated.

The DEC machines were directly competitive with Sigma 5s, 6s and 7s, according to Currie, director of special businesses for Xerox's corporate staff.

XDS followed DEC with a pricing reduction of its own that had a negative effect on XDS' revenues and profits in the amounts of several million dollars each by 1973, he said.

The lower DEC prices affected XDS primarily in purchase situations, he told the court. While XDS generally watched IBM prices in the lease market, Currie said Xerox kept its eye on DEC in purchase situations.

Several of the minicomputer manufacturers — notably DEC, Varian and Hewlett-Packard — began aggressive growth, taking business away from XDS between 1970 and 1973, he said.

The 1970-71 economic recession made the competition all the more fierce, he said.

XDS' Universal Timesharing System (UTS) software was still under development in 1970. Its predecessor, the Batch Timesharing Monitor (BTM), on the market at the time, was "a marginally competitive operating system" in Currie's view and had a significant negative effect on XDS 1970 revenues as a result.

The Sigma series, particularly the 3, 5, 6 and 7 models, was in various stages of obsolescence, he said. XDS refactored the pricing of the Sigma 6s and 7s to account for increasing deficiency due to the age of the technology first announced and delivered in 1966.

But this move only served to lower the company's revenues and prices by several million dollars as well, he observed.

Xerox did not produce replacements for the Sigma series when they were most necessary — in 1971, Currie said.

Instead, announcements and deliveries of the Xerox 530, designed to replace the Sigma 3, didn't occur until January 1973 and the Sigma 5s, 6s and 7s weren't relieved by the Xerox 550 and 560 systems until February 1974, he said.

Currie suggested these events had a qualitative impact on Xerox's credibility in the industry.

Finally, he noted, a 1972 reorganization of the computer business from the separate entity known as XDS into the functional units of Xerox's corporate structure negatively affected the company's efforts in the DP industry by delaying the announcement of products by at least six months and perhaps as much as a year.

Xerox Warned Not to Expect Big DP Profitability

(Continued from Page 39)

"A number of higher management people stated this goal," Currie said. To achieve this end, Xerox determined XDS would have to achieve over $1 billion in computer revenues by 1980, participate in a larger share of the business DP market and gain more people with business DP expertise, he explained.

Xerox wanted "to control 15% of the computer market, whatever that is," Cohen said. He said he personally did not consider the acquisition of SDS to be sufficient to broaden Xerox's market interests in such a way as to make it directly competitive with IBM.

He listed as SDS' primary application areas in 1969 time-sharing, real-time data acquisition, processing and control, scientific data reduction or seismic processing, scientific batch, communications and multimode or multiuse systems.

The desire for a 15% market share meant Xerox had to have a tremendous array of products and had to compete with IBM for 60% to 75% of the sales opportunities in the field, Cohen stated.

"This meant competing against a very successful competitor in the area of its maximum strength," he said.

Little Virgin Territory

The commitment of various industries to business DP and the fact that "little virgin territory remained to be plowed in the performance ranges XDS was supplying" made displacement the chief means for acquiring a greater market share — "displacement primarily of IBM equipment," Cohen said.

Cohen could perceive no significant incentive for customers to shift vendors, he said, and did not see how Xerox could do the vast number of business DP jobs any better than IBM could. At best, they would be about even in performance, he said.

That left Xerox with the option of offering price advantages, but since the company was already operating at a low profit margin, such a move didn't make sense, Cohen commented.

The recession of 1970-71 and a cutback in government spending had a serious effect on XDS, he testified. It went from a pretax profit of $24 million in 1969 to a loss of $20 million in 1970.

After 1969, XDS never again achieved an annual revenue as high as the $120 million it obtained that year. In 1970, the figure was about $80 million and thereafter hovered around the low to mid-$70 million range.

Currie also cited the reduction in XDS revenues in 1970 as the precipitating factor for the complete evaporation of Xerox's number two aspirations. First articulated in the summer of 1970, the goal was completely gone by the beginning of 1973, he said.

In addition to the economic slowdown, Sigmas 3, 5, 6 and 7 were beginning to show their competitive weariness. Cohen maintained this "tired iron" should have been replaced more quickly by the Xerox 530, 550 and 560 than it was.

A 1971 marketing strategy called "moving out" and dedicated to increasing Xerox's business DP share and to determining the "elasticity" of the computer marketplace for the products XDS already had in the field also contributed to the company's declining position, in Cohen's view.

Xerox hired 40 additional salespeople with expertise in business DP, placed them around the country and told them to go after multipurpose markets not previously pursued.

Cohen suggested these salespeople were not sufficiently adept at selling in XDS' traditional markets. Currie observed the growing obsolescence of the Sigma line didn't help the sales force in its task.

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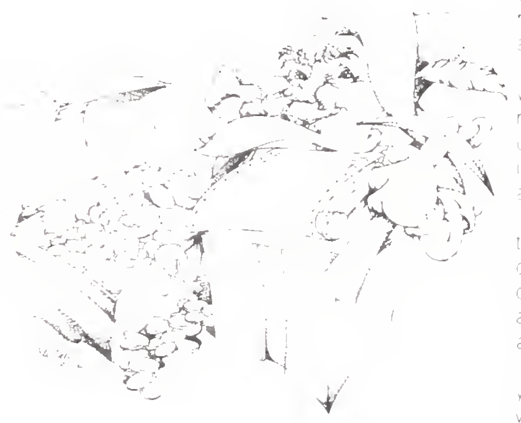

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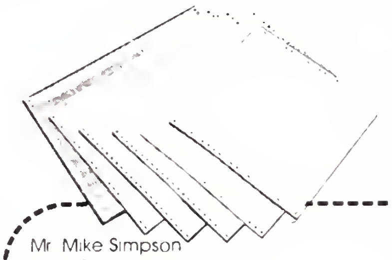

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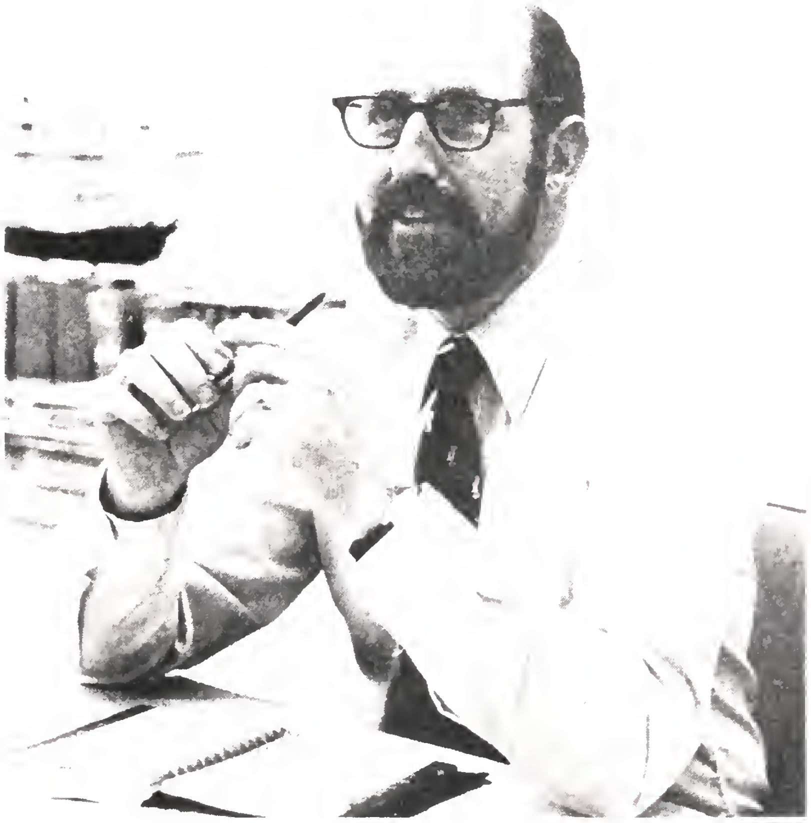

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Intel Not Waiting for IBM to Set Pace of Offerings

By Molly Upton
Of the CW Staff

SUNNYVALE, Calif. – Intel Corp.'s Memory Systems Division isn't going to wait for IBM to come out with new products before it markets products for IBM 370 and other lines, according to Richard J. Egan, assistant general manager.

The user community has become much more sophisticated, Egan said, increasing the likelihood of user acceptance of products which do not have comparable IBM models.

Intel is shipping charge-coupled devices (CCD) to about six OEMs for trial purposes, he noted. These serial access units are "ideal" for use with virtual systems, he said.

Egan said he sees CCDs utilized in systems of less than 20M bytes. Comparing the development of CCDs with random-access memories (RAM), he observed the first RAMs were 256 and then rose to 1K, 4K and 16K. Intel's first CCD is a 16K unit.

The CCD looks like a natural to replace high-speed head per track disks, he remarked.

Strategy Goal

The Memory Systems Division's goal for 1976 is to develop product market planning strategy for IBM lines, Egan said.

He gave the impression these products would be enhancements to the IBM line to extend the life of the product range and the memory.

In addition to work on CCD systems, Intel is looking at large storage areas utilizing 16K RAMs. The firm is delivering 16K RAMs, Egan said.

Intel is also investigating freestanding DP equipment which uses lots of memory, but whose computational needs can be satisfied by microprocessors, he said.

The principal objective, he said, is to sell a product with an extremely high content of memory.

Egan explained the change in users' attitudes toward independent suppliers and products without an IBM equivalent by saying DP managers have moved from regarding such nonmainframers' products as "foreign" to "independent."

"In yesterday's mentality, users would wait for IBM," he said. But times have changed since the 370 came out utilizing semiconductor memory, he said.

It looks like technology will be more of an impetus in the development of new products, he said. Products will be spurred on by technology, rather than by waiting for IBM to perceive users' needs.

With this in mind, it would seem logical that semiconductor houses would play a major role in introducing new products, Egan said.

While 360 users didn't care what was in the box, users today "are extremely more knowledgeable and asking 'What type of RAMs?' " he said.

Part of this change is because independents have been touting their technological proficiency and IBM is trying to change its image from a marketing company to a technology company, he said. All these factors are helping educate the user.

Users are in a better position to select products on the basis of a company's ability to make that product, he said, rather than by abiding by brand names.

The Intel products could be channel-compatible or freestanding, he said. If the Intel device is channel-compatible, Egan remarked, it is unlikely IBM would change channel structure.

If the device is free standing, then the possible IBM countermoves are not relevant. If IBM comes out with a better product, that's another issue.

"We're willing to stand up and slug it out," he said.

The Intel sales force is being instructed to come up with suggestions of what users want to see in their systems as an aid to product planning, Egan said.

Intel began marketing its 370 memories about nine months ago. Previously its marketing was handled through Computer Investors Group and Itel.

Intel makes memories for the 135, 145, 158 and expects to announce its unit for the 168 soon. That memory will utilize an Intel 8080 microprocessor, Egan said.

He expects Advanced Memory Systems (AMS), National Semiconductor Corp. and Cambridge Memories to all announce units for the 168.

Remarking on the change in the memory market since the days of the 360, when there were about a dozen competitors, Egan said there now are about three in the market.

AMS counts as one, National and Cambridge each as one-half and Intel as one, he explained.

AMS is probably the largest in terms of installed base, but Intel is currently shipping more units, he said.

Intel handles its own leases. About half of its systems sold; this is a much higher ratio of purchase to lease than in the days of the 360, Egan said, attributing the increase to the anticipated longevity of the 370.

Also, since Intel is in the business to stay, its equipment is likely to have a high residual value, he said.

Not only has the number of suppliers dropped since the 360 era, but most of the activity is centered on the West Coast, he said. The amount of memory acquired for a 370 is about four times as much as on a 360, he said, and the number of machines installed is still growing.

CW Photo by M. Upton
Richard J. Egan

Intel just started marketing the 135 and 158 and he declined to compare his expectations for 1976 compared with 1975.

The 168 market, however, could be comparable in size to the 158, Egan indicated. Although there are fewer machines installed, they take larger memories, he noted.

Most of Intel's orders are for memory on new systems, he observed, but the percentage of orders for upgrades is increasing.

The market is by no means a constraint on our business, he said.

Intel recently created a new division, the Microprocessor Division, bringing the number of units to four. The others are components and Microma Watch. Memory Systems supplies memories to both OEMs and end users from the board level on up to complete freestanding systems.

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MAI Units Name Four

NEW YORK – Several appointments have been made at units of Management Assistance, Inc. (MAI) companies.

Ross C. Gwinner has been appointed president of Sorbus, Inc., an independent maintenance firm based in King of Prussia, Pa.

At Basic/Four International, Evan W. Rowe was named vice-president.

At Basic/Four Corp., Norman L. Kreuder was appointed vice-president of systems and programming.

Other Moves

- Samuel A. Alward has been named senior vice-president of operations at Securities Industry Automation Corp. and Burton Barnett and Jack Tieri have been named vice-presidents.
- Thomas M. Walsh has been elected vice-president and controller of Incoterm Corp.
- Horace A. Lindsay has been named vice-president of advanced programs and Paul R. Cooper has been appointed vice-president of operations at Bunker Ramo Corp.
- Warren C. Sprague has been named vice-president of corporate field marketing for the Northeast U.S. at Honeywell, Inc.
- James L. Siehl has resigned as vice-president of sales and marketing of the Naked Mini Division at Computer Automation, Inc.
- George R. Rea has been named vice-president of sales at Centronics Data Computer Corp.
- John Karsten has been appointed vice-president of operations at Western Peripherals.
- William K. Marrinan has been named president of Terminal Communications, Inc.
- James T. Halom has been elected corporate treasurer of Control Data Corp., in addition to his duties as vice-president.
- Robert Abernathy has been appointed vice-president of marketing at Techtran Industries, Inc.
- Theodore W. Robinson Jr. has been appointed executive vice-president of Optical Scanning Corp.
- Clare G. Kruse has been appointed vice-president of field operations for Itel Corp.'s Field Engineering Division.
- Ronald W. Zolkiewicz has been named vice-president of marketing of Bergen Brunswig Dataservice Co.
- Robert N. Brown and Milton Sanders have been named vice-presidents of engineering and marketing respectively at Electronic Associates, Inc.
- Donald G. Thomson, chairman of the University Computing Co. executive committee, has been elected to the board of directors at Wyly Corp.
- Levon Kasarjian has been named vice-president and secretary of Greyhound Computer Corp.
- Melvin R. Wellerstein has been promoted to vice-president of marketing at TRW Datacom International.
- Samual W. Adams and Martin A. Toomey Jr. have been appointed assistant vice-presidents of marketing and international operations respectively, at Incoterm Corp.
- William F. Buster has been named vice-president of computer and communications systems and Richard F. Moore has been named assistant vice-president of microelectronics operations at NCR Corp.
- Theodore W. Robinson Jr. has been appointed executive vice-president of Optical Scanning Corp.
- Francis Leeman has been appointed president of MDS International Service Corp.
- Donald S. Cole has resigned as executive vice-president of Dearborn Computer Leasing Co.
- Ernest Archer has been elected vice-president of programming of Sedgwick Printout Systems.

For Use With Adabas

Software AG Shopping for Mini System

By Nancy French
Of the CW Staff

RESTON, Va. – Software AG of North America, Inc. is shopping for a minicomputer to equip with its data base management system, Adabas, the firm's president, John Maguire, said in an interview here recently.

But judging which mini is the right one – the one that will have the most users five years from now – is not an easy decision, Maguire said.

Adabas was implemented on the larger IBM 370s only to conserve Software AG's resources while maximizing profit. Choosing IBM equipment was an easy decision since IBM has more systems installed than any other mainframer, he said.

The minicomputer industry, however, is still in its infancy, and it's not immediately apparent just where various manufacturers will go, he said. "Eventually we'll probably end up on three of four systems and charge $30,000 to $40,000 per system," he said.

Maguire cited as important considerations in the decision the flexibility of the manufacturer. Software AG wants to be able to influence its hardware architecture, he said.

Technology Changing Fast

Another consideration is technology. Minicomputer technology is changing so fast it's difficult to make a decision today about a technology that could be considerably different three to five years from now, he said.

Several mini manufacturers Software AG has already considered turned out to be doing nothing particularly innovative technologically, he said.

In addition, the first mini will have to have a good Cobol compiler, he said.

Maguire predicted that rather than one mini manufacturer dominating the industry, three of four will rise to the top, but he doesn't want to make a mistake and select the one that turns out to be "Number 4," he said.

Adabas, the company's only product, sells for $120,000 per installation, with a slight discount for multiple sites within the same company, Maguire said.

With sales doubling every year, Software AG posted revenues of more than $9 million by 1975's year end.

Adabas has been installed at 150 user sites all over the globe, Maguire said, with its most recent users the South African Railways and the A.A. Mutual Insurance Co., both in Johannesburg, South Africa, Maguire said.

Sales Expected to Double

Software AG of North America's president said he expects sales to double again in 1976, saying "we are far ahead of my original five-year plan."

Among its U.S. users are the Chase Manhattan Bank, E.I. DuPont & Co., the state of Colorado, the state of California and the District of Columbia government.

In the United Kingdom, Maguire cited British Railways, Barclays Bank, Ltd. and the Plastics Division of Imperial Chemical Industries, Ltd.

Software AG has grown to about 60 people in the U.S. and has sales offices in 22 locations worldwide.

But things haven't always been so good, Maguire said.

In 1970, Software AG, a small spin-off from the German software firm, AIV, nearly went under after AIV poured all its resources into developing Adabas.

Maguire described Adabas as a unique, self-contained data base management system based on a form of inverted file structure with emphasis on retrieval capability and data compaction.

Received Funding

On Christmas Eve in 1970 it received an infusion of funds from the German government in the form of a retroactive grant of 600,000 marks – for its research in data base management.

At that time, various U.S. and foreign governments had spent nearly $1 billion trying to develop the data base management concept without much success, he said.

Maguire discovered Software AG while on a business trip to Germany. As senior vice-president and director of technical operations for Consolidated Analysis Center, Inc. (CACI), Maguire was responsible for finding and investigating representatives to open up the European market.

At that time, Software AG was still wholly owned by AIV, a software house founded by Peter Kreis in 1962. Peter Schnell, the "technical genius" who developed Adabas, was one of Kreis' employees.

CW Photo by N. French
John Maguire

"Where everyone else had failed, Schnell seemed to have solved all the problems." But Software AG's management was "very conservative" about marketing, Maguire said. "Somehow they thought the world would beat a path to their door.

"I tried to get CACI to represent Adabas in the U.S., but it was more interested in selling consulting services," he said.

"So I persuaded Kreis I could set up a U.S. subsidiary on my own and invested all my resources about $30,000 in the business.

"For the first 15 months, I sold Adabas out of the den in my house in Reston, with my wife answering the phone," he said.

"I was my own technical director," he said. "I also wrote all the sales literature myself and my wife and kids mailed it to potential customers."

"I was losing five out of five proposals in those days," he recalled, and "it was only pure tenaciousness that kept me going."

At the time, Software AG had only one user the West Deutsche Landus Bank in Duesseldorf, West Germany, which installed Adabas in early 1971.

Then, in May 1973, Maguire got his break.

"I was selling against Cincom Systems, Inc.'s Total at Massachusetts Mutual Life Insurance Co., and the Total salesman wanted to close by the end of the quarter so he could collect his commission.

"The technical people weren't making their decision fast enough for him so he went over their heads. They were so aliented as a result, they decided to take a chance on Adabas," he said.

Then in June, the City of New York decided to go with Adabas. "That caused a lot of difficulties, too, because New York didn't want to deal with a foreign company," he said.

"So to get the sale we had to make Software AG of North America a separate corporation."

Today Software AG is a multinational company with cross-ownership and a board of directors, he said.

HP Hosts Black Students

CUPERTINO, Calif. Nearly 200 black students from 11 Santa Clara County high schools will get a first-hand look at the Computer industry on April 9 when they participate in the third annual Black Students' Day program hosted by Hewlett-Packard's (HP) Data Systems Division here.

The day-long event will include a plant tour, hands-on use of the division's computer systems and discussions about careers and employment in industry.

The program is being coordinated by black employees of four local HP divisions within the company's Computer Systems Group.

"We feel it's extremely important to expose these students to potential careers in the computer industry while they still have time to select a technical course of study," according to Richard W. Anderson, general manager of the Data Systems Division. "We're very pleased with the program's success."

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Current Opportunity to 'Go Public' Not to Be Missed

By Donald Kirsch

Special to Computerworld

While the number of companies offering their securities to the public for the first time [illegible] 1975, [illegible] noticeable upturn in [illegible] number of letters of [illegible] underwriting [illegible] the "new issue" market [illegible] years.

Equity [illegible] already public corporations [illegible] are also on the rebound.

What [illegible] mean to you? If you have [illegible] begin thinking of public financing. Money will get tight again and the opportunity should not be overlooked.

One significant change between the next market and the last is that electronic and computer shares – while they may be highly salable – will probably not lead the parade again.

The next wave will also differ in that it will be pretty well limited to the first offerings of seasoned companies with a record rather than only a prospect of earnings. There will be little opportunity at this stage to gain public funds for concept and start-up companies.

The "public venture market" is always off. In today's market, a company seeking a new issue should have an annual volume of more than $10 million with sharply rising earnings.

Prosaic Reason

The most compelling reason for a firm to go public is not to make a killing for the principals nor to create a vehicle for merger and acquisition purposes, but rather for the prosaic reason of creating an alternative avenue of financing for growth, as well as personal considerations regarding death and taxes.

A basic tenet is: Finance when you don't need the money and when the public market is available. Always be as ready to finance as you are to add an exciting new product – and when the banks and equity markets return to a dry cycle, you'll be comfortable and in a position to outgrow your competitors, if not to purchase those competitors who have run out of money and whom you couldn't afford before.

The public market, in good times, gives a company an alternative to bank or insurance financing. It also gives the company management a security it can use for a private placement, should it not wish to do another public offering.

The flexibility of being public is great, but there are added burdens, such as reporting requirements for the Securities and Exchange Commission (SEC), increased legal and accounting fees and unhappy and sometimes vocal stockholders when the market is down.

None of this compares with the positive factor of having an alternative source of financing beyond bank lines and your own cash flow – even if the equity market is usable only once every several years.

The second purpose for a public offering relates to personal estate management. When a company's securities are traded in the open market, the value of the shares in an estate are easily and precisely determined.

In the absence of public ownership and a quoted market price, responsibility for establishing the value of stock in a private corporation is on the tax collector.

Two Shortcuts

There are two shortcuts in going public: merging with a smaller but already public company through an exchange of stock or acquiring a corporate shell which has shareholders but no income base.

The straightforward approach of a company going public by itself is the least complicated and the one most favored. Investment bankers and underwriters are not searching out potential underwritings as they did five or six years ago.

Today, companies planning on going public have to seek out and cultivate potential investment bankers. When the appropriate time comes, the more knowledge the investment banker has of a particular company, the more likely he is to be interested in that company when market conditions permit a financing.

Screening Bankers

In screening investment bankers for possible association, there are three important criteria:

- The sizes of his past underwritings.
- The industries in which he has underwritten companies.
- The geographic area in which he operates.

And what does the investment banker look for in a candidate for underwriting? He wants a company with a growth rate better than that of its industry and an industry with a growth rate which surpasses that of the Gross National Product.

The company should have a demonstrated ability to pay dividends, even if it has not done so. A recognized and respected product line is mandatory, as are a dominant market position, patent protection and a potentially growing market.

A management team combining seasoning and mature judgment with drive and enthusiasm is also prized. If an underwriter could specify age and experience levels, he would call for a top management between 40 and 50 years of age with a second echelon 10 years younger.

Five years of certified financials at the time an offering is made are also a requirement. The caliber of the public accounting firm preparing the figures is an important consideration.

The public accounting firm should be a respected one, although it does not necessarily have to be one of the "Big 8."

Established credit lines with a strong regional bank generally will be considered more desirable than those with a major city bank. In recent credit squeeze, the so-called "country banks" were often able to extend their established customers larger loans and better terms than those available to the customers of the more pressured big city institutions.

For legal counsel, the main requirement is for good SEC experience. Such experience can be found on a regional basis and in the major money markets outside of Wall St.

Kirsch is president of the Wall Street Group, a financial consulting firm.

Kranzley Asked to Develop EFT Switch for Md. Banks

CHERRY HILL, N.J. – Kranzley & Co. has received a contract to develop an electronic funds transfer (EFT) switch and point-of-sale terminal control system for a group of Maryland banks.

The switching center, tentatively named Maryland Switch, Inc., will be owned and operated by five large Maryland commercial banks.

The system will have capacity for credit authorization, electronic transfer of deposits and withdrawals and eventually all point-of-sale data capture. It will be able to accept the banks' customer card-generated transactions, Kranzley said.

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Patrick M. Collins, Data Processing Manager
First Church of Christ Scientist, Boston, Mass

"Mr. Stimler presents his material in the seminar as he does in his books - with clarity and conciseness, devoid of 'computerese.' Here is a practical methodology for putting data processing and associated services on a scientific, businesslike basis that top management can understand and appreciate."

Robert Barrow, Performance Controller
Rhode Island Hospital Trust National Bank, Providence, R.I.

"First, I would like to commend Mr. Stimler, who is a rare individual, with a great deal of knowledge of experience, who can impart his knowledge in very clear and precise language. This seminar has reminded me that very complicated situations can be broken down to manageable and understandable parts. I feel that with this beginning, I can proceed to begin to measure and evaluate our computer system."

J. F. McHenry, Manager, Computer Operations
Continental Can Co., New York, N.Y.

Saul Stimler is the Seminar Leader

Saul Stimler is President of Stimler Associates. He is a 16-year veteran in data communications and data processing. He has provided in-house training, specification preparation, design, evaluation, performance improvement, system planning, benchmarking and project management consulting services for leading companies and government agencies in the United States and Canada. Mr. Stimler is the author of the highly acclaimed book, *Data Processing Systems - Their performance, evaluation, measurement and improvement*, and this book will be an important part of the course materials. Advance copies are available - see the coupon below.

Charges and Enrollment

The charge for the entire 2-day seminar, including continental breakfasts, luncheons, and all course materials is only $250 per registrant. This does not include hotel rooms, if necessary, but we have reserved space at the seminar hotels for attendees who wish them.

To enroll, look over the schedule below, fill in the coupon and send it in. Remember, enrollment is limited and no space can be firmly held until we have received check or purchase order.

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Ishikawa Prize Awarded For Ship-Design System

NEW YORK – The 1975 Ishikawa Prize has been awarded to Nippon Kokan (NKK), Japan's second largest steel producer and an integrated steel-maker/fabricator-constructor/shipbuilder, for its computerized ship-designing system.

The Ishikawa Prize, established in 1970, is awarded annually to companies, individuals and groups for outstanding technical achievement in improving product quality and contributing to modernized company management.

The first shipbuilder to be awarded the prize, NKK began using computers in shipbuilding in 1965. Its system, called NKK Advanced Ship Design (NASD), was completed in 1973.

The NASD system integrates various computer programs for coordination of basic hull designing with production drawings that can number in the thousands for a single vessel and provides data for numerical control processing and fabrication of hull components.

Among programs are Lofting Translation Language and Graphic Lofting, which permit dialogue between designer and computer via graphic display monitors. Drawings can be checked against displays on screen, be modified or added to.

Airline DP Investment Estimated

WASHINGTON, D.C. – While it is probably impossible to determine the world airline industry's exact investment in computer systems, estimates place the figure somewhere between $1 billion and $2 billion.

Air Transport World, an industry publication, surveyed 19 airlines which account for 8.5% of the world's passengers.

Lease Costs

Those airlines' computer-lease costs are $7.9 million annually, a figure which can be projected to $873 million annually for all airlines in lease costs alone, the magazine reported.

The survey also found that 12 airlines, representing 17.6% of all world passenger traffic, had a purchase investment in computers of $279 million.

This figure can be extrapolated to arrive at a $1.59 billion airline industry computer investment total, the article reported.

Expansions

Access Computer Co. has expanded its facilities to a 4,500 sq-ft area at the O'Hare Aerospace Center in Chicago to accommodate the company's time sales division.

Datamedia Corp. has tripled the size of its manufacturing headquarters and now occupies 20,000 sq ft in the 7300 Industrial Center in Pennsauken, N.J.

Microdata Corp. has expanded its manufacturing facilities with the leasing of a 20,000 sq-ft facility in Santa Ana, Calif.

Univac plans construction of a 42,000 sq-ft addition to its PC board manufacturing plant in Salt Lake City, Utah.

TRW Data Systems will establish a marketing, manufacturing and customer service facility for its retail point-of-sale organization in Hawthorne, Calif. The move should be completed by the end of January 1976.

The Memory Systems Division of Intel Corp. is occupying a 50,000 sq-ft manufacturing and warehouse facility adjacent to the division's initial facility.

Foster Reelected Chairman

NEW YORK – Lowell W. Foster, director of corporate standardization at Honeywell, Inc., has been reelected to a second one-year term as chairman of the Company Member Council of the American National Standards Institute.

POSITION ANNOUNCEMENTS

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DIRECTOR, OFFICE OF COMPUTING SERVICES

LSU Medical Center seeks to employ a qualified individual to develop a coordinated computing activities program. Candidate should have at least 10 years experience in Health Sciences Computing with a minimum of 4 years in management. Individual should have training in both computer science and medicine/health care; Ph.D. or M.D. desired and have an understanding of academic computing in health sciences research and education and administrative/business data processing. New Director will coordinate computer operations (IBM 370/125) plus access to IBM 370/158, DEC 10 and Honeywell 6080); direct software development for administration and research; and create health sciences computer education program. Salary open. Send resume to:

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position announcements

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[illegible] Hardware, Inc. [illegible] open positions for programmers and [illegible] analysts. Applicants must have [illegible] experience [illegible] design and [illegible] using ANSI-COBOL, FORTRAN [illegible] RPG II. [illegible] preferred [illegible] time sharing [illegible] base [illegible] highly desirable [illegible]

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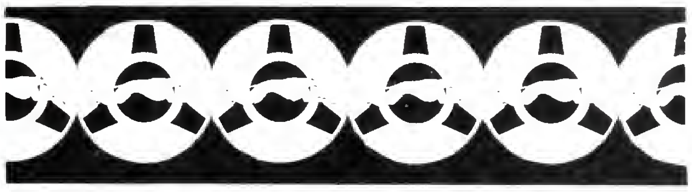

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Doubled Net Sets Inforex Record in '75

BURLINGTON, Mass. – Earnings for both the year and the quarter ended Dec. 28 more than doubled at Inforex, Inc.

Earnings for 1975 climbed to a record $1.5 million or 54 cents a share compared with $633,000 or 22 cents a share in 1974.

Revenues increased by 10% to almost $57 million compared with nearly $52 million a year ago.

Of this year's revenues, $28.4 million came from sales, compared with 1974 sales of $29.1 million. Rental and service revenues climbed to nearly $28.6 million compared with last year's almost $22.9 million.

Fourth-quarter earnings jumped to $943,000 or 33 cents a share compared with $360,000 or 13 cents a share in the year-ago period.

Revenues for the quarter, however, declined to $15.5 million compared with nearly $16.4 million in this quarter last year.

Sales contributed nearly $8.1 million to the quarter figure, compared with sales of $10.1 million in the same period last year. Rental and service revenues for the quarter rose to nearly $7.5 million compared with about $6.2 million last year.

Special credits for tax-loss carryforwards were included in these figures. The special credits boosted earnings $339,000 in 1975 compared with $119,000 in 1974.

In the quarter, the credits totaled $281,000 compared with $27,000 in the year-ago period.

The earnings for 1975 and prior years have been restated in compliance with recent guidelines from the Financial Accounting Standards Board on the treatment of foreign exchange rate fluctuations.

The gains in revenues and earnings were achieved despite a significant shift in the company's sales and lease mix, according to T.C. Cronin, Inforex chairman.

The rental and service portion moved up as a percentage of revenues from 44% in 1974 to 50% in 1975, he added.

Although Inforex's steady quarterly improvements over the past two years has picked up momentum, many of the company's overseas operations are still vulnerable to economic pressures, Cronin said.

"Accordingly, we will continue to control our growth rate in 1976 and concentrate on improving the quality of our earnings," he said.

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Itel Tops 1974 In Year Results

SAN FRANCISCO – Itel Corp. achieved record revenues and earnings for the year ended Dec. 31.

Earnings rose to $10.7 million or $1.25 a share compared with $9.7 million or $1.07 a share last year.

Revenues rose to $204 million compared with $143.5 million in 1974.

This was the third consecutive year in which the firm improved its profit performance, according to President Peter S. Redfield.

Itel arranges capital equipment lease transactions, leases equipment and provides DP services.

Wabash Posts Rise for Year

WABASH, Ind. – Wabash Magnetics, Inc. reported record revenues and improved earnings for 1975 following an upsurge in fourth-quarter results.

Earnings for the year totaled $1.3 million or 80 cents a share compared with almost $1.2 million or 70 cents a share in 1974. Revenues edged up to a high of about $33 million compared with $32.9 million last year.

Earnings in the quarter ended Dec. 31 climbed to $705,268 or 43 cents a share compared with $134,572 or 9 cents a share in the year-ago quarter.

Revenues hit a record $9.5 million compared with almost $7.2 million in the fourth quarter last year.

The company reduced inventories by 23.4%, payed off bank borrowings of $2.3 million and reduced trade accounts payable by 14.3%.

It moved ahead carefully with capital expenditures and engineering programs were expanded, according to William F. Boyd, president.

Wabash is ready to take advantage of opportunities "to broaden product lines through outside acquisition and continuing development from within," he added.

Ampex Revenues Show Slight Gain

REDWOOD CITY, Calif. – Ampex Corp. reported slightly increased revenues for both the nine months and quarter ended Jan. 31.

Earnings rose 36% in the quarter but dropped for the nine-month period. However, last year's nine-month earnings included nonrecurring pretax income from a settlement with IBM.

For the nine months, earnings dropped to about $7.2 million or 66 cents a share from almost $16.2 million or $1.49 a share in the year-ago period, which included the $13,000 settlement.

Utilization of net operating loss carryforwards for the nine months were $2.7 million compared with $6.8 million in this period last year.

Nine-month revenues rose to nearly $190.5 million compared with almost $180.8 million in this period last year.

Third-quarter earnings climbed to about $2 million or 19 cents a share compared with about $1.5 million or 14 cents a share last year.

Revenues increased to about $60.8 million compared with approximately $59.4 million in the year-ago quarter.

"Despite our higher trend of sales, inventory levels today are 5% lower than at the beginning of this fiscal year," Arthur H. Hausman, president and chief executive officer, said.

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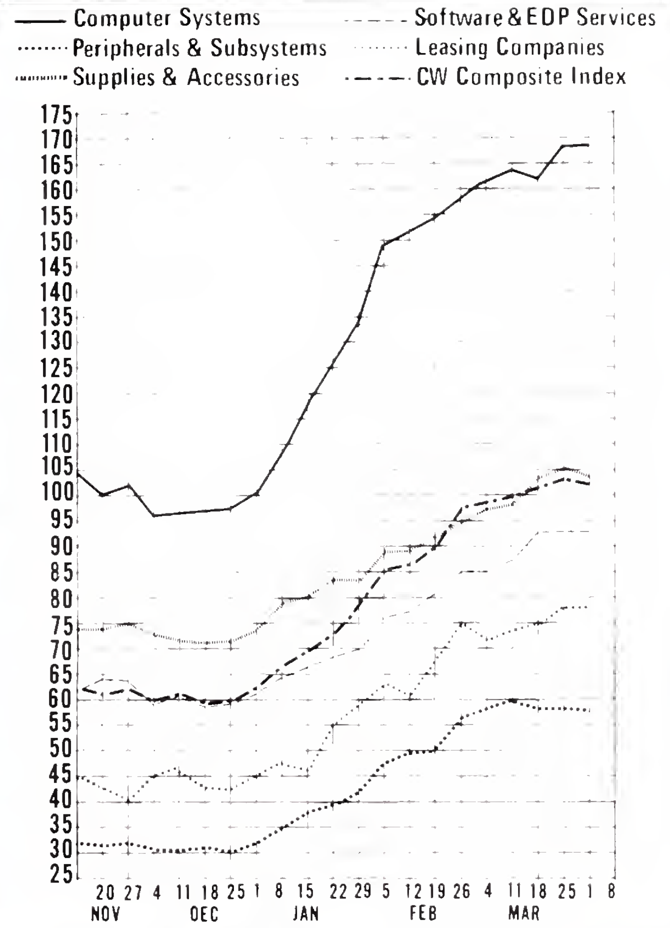
Mike Burman	Frank Gallo	Jim Richardson	Jim Richardson
(617) 965-5800	(201) 461-2575	(415) 495-0990	(213) 477-3535

Earnings Reports

TYMSHARE Year Ended Dec. 31	1975	1974
Shr Ernd	$1.22	$.89
Revenue	56,442,669	46,455,477
Tax Cred	125,000	150,000
Earnings	4,722,258	3,298,283

COMPUTER USAGE Year Ended Sept. 30	1975	1974
Shr Ernd	$.60	$.84
Revenue	5,554,000	4,052,000
Spec Cred	151,034	333,000
Earnings	480,016	705,846

COMPUTERWORLD Computer Stocks Trading Indexes



DIGITAL COMPUTER CONTROLS Three Months Ended Nov. 30	1975	1974
Shr Ernd	$.11	$.05
Revenue	3,006,052	2,709,684
Earnings	174,386	72,229
9 Mo Shr	.25	.11
Revenue	7,849,506	7,666,547
Earnings	382,306	167,174

HARRIS Three Months Ended Dec. 31	1975 (000)	1974 (000)
Shr Ernd	$1.08	.....
Revenue	125,314	$121,496
Disc Op	.....	(17,220)
Earnings	6,565	(12,211)
6 Mo Shr	2.05	.....
Revenue	243,974	228,625
Disc Op	.....	(18,539)
Earnings	12,416	(8,490)

LOGICON Three Months Ended Dec. 31	1975	1974
Shr Ernd	$.25	$.25
Revenue	7,994,000	8,392,000
Earnings	215,000	211,000
9 Mo Shr	.72	.65
Revenue	24,306,000	26,000,000
Earnings	617,000	556,000

TEXAS INSTRUMENTS Year Ended Dec. 31	1975 (000)	1974 (000)
Shr Ernd	$2.71	$3.92
Revenue	1,367,621	1,572,487
Earnings	62,142	89,621
3 Mo Shr	.91	.92
Revenue	390,942	418,705
Earnings	20,783	21,092

CALIFORNIA COMPUTER PRODUCTS Three Months Ended Dec. 28	1975	1974
Shr Ernd	$.04	$.09
Revenue	31,495,000	31,873,000
Earnings	131,000	270,000
6 Mo Shr	.....	.33
Revenue	58,150,000	64,746,000
Earnings	(3,093,000)	1,052,000

ANDERSON JACOBSON Three Months Ended Dec. 31	1975	1974
Shr Ernd	$.09	$.07
Revenue	4,340,770	3,585,892
Earnings	224,876	176,715
9 Mo Shr	.26	.19
Revenue	12,771,133	9,431,163
Earnings	646,663	478,261

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 31, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

TRADE*QUOTES

EXCH		1975-76 RANGE (1)	CLOSE MAR 31 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	62-109	102 3/4	+1 3/4	+1.7
O	COMPUTER AUTOMATION	2- 19	17 3/8	-1 5/8	-8.5
N	CONTROL DATA CORP	11- 26	25 1/4	- 1/4	-0.9
N	DATA GENERAL CORP	10- 55	54 7/8	+1 1/8	+2.0
O	DATAPOINT CORP	6- 39	36 1/4	- 3/4	-2.0
O	DIGITAL COMP CONTROL	1- 4	3 1/4	0	0.0
N	DIGITAL EQUIPMENT	46-179	175 1/2	+1 3/4	+1.0
N	ELECTRONIC ASSOC.	2- 5	4	- 3/8	-8.5
A	ELECTRONIC ENGINEER.	5- 16	14 5/8	- 7/8	-5.6
N	FOXBORO	23- 42	36 5/8	- 1/2	-1.3
O	GENERAL AUTOMATION	4- 14	9 3/4	- 1/4	-2.5
O	GRI COMPUTER CORP	1- 1	7/8	0	0.0
N	HEWLETT-PACKARD CO	58-120	115 1/2	+5 1/2	+5.0
N	HONEYWELL INC	22- 56	48 1/2	- 1/4	-0.5
N	IBM	159-266	262	+ 1/4	0.0
O	MANAGEMENT ASSIST	1- 2	2 3/8	0	0.0
O	MEMOREX	1- 26	25	+1 1/4	+5.2
O	MICRODATA CORP	2- 24	23 3/4	+ 5/8	+2.7
O	MODULAR COMPUTER SYS	5- 19	10 3/4	0	0.0
N	NCR	15- 39	27 5/8	-1 1/4	-4.3
O	PRIME COMPUTER INC	2- 10	9 3/4	- 1/4	-2.5
N	PERKIN-ELMER	16- 30	25 5/8	+1 5/8	+6.7
N	RAYTHEON CO	26- 59	52 1/4	+ 3/4	+1.4
N	SPERRY RAND	26- 49	43 7/8	+1 1/4	+2.6
O	SYCOR INC	5- 31	27 1/4	0	0.0
A	SYSTEMS ENG. LABS	1- 10	9 1/8	-1 1/8	-10.9
N	VARIAN ASSOCIATES	7- 18	15 5/8	- 1/2	-3.1
N	WANG LABS.	7- 20	18	0	0.0
	LEASING COMPANIES				
O	COMDISCO INC	1- 10	9 3/4	+1 3/8	+16.4
A	COMMERCE GROUP CORP	2- 4	3 1/8	+ 1/8	+4.1
A	COMPUTER INVSTRS GRP	1- 3	2 1/8	- 1/2	-19.0
M	DATRONIC RENTAL	1- 1	5/8	0	0.0
A	DCL INC	0- 1	3/4	0	0.0
N	DPF INC	3- 7	6 3/4	+ 7/8	+14.8
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 5	4 1/4	0	0.0
N	ITEL	3- 13	11 3/8	- 3/8	-3.1
N	LEASCO CORP	4- 14	12 1/8	- 1/4	-2.0
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	0- 4	1/4	0	0.0
A	PIONEER TEX CORP	2- 9	7 1/2	- 1/4	-3.2
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	10 7/8	- 5/8	-5.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1975-76 RANGE (1)	CLOSE MAR 31 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 1	3/4	0	0.0
A	APPLIED DATA RES.	1- 10	2 1/2	- 1/4	-9.0
N	AUTOMATIC DATA PROC	29- 65	63	- 3/4	-1.1
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	COLEMAN AMERICAN COS	4- 6	4 1/4	- 1/8	-2.8
O	COMPUTER DIMENSIONS	2- 7	5 1/4	-1 1/8	-17.6
O	COMP ELECTION SYSTMS	3- 7	5 3/4	- 1/4	-4.1
O	COMPUTER HORIZONS	1- 1	1 3/4	0	0.0
O	COMPUTER NETWORK	1- 5	3 5/8	- 1/8	-3.3
N	COMPUTER SCIENCES	2- 8	6 7/8	- 3/8	-5.1
O	COMPUTER TASK GROUP	1- 1	1 1/8	+ 1/8	+12.5
O	COMPUTER USAGE	2- 6	5	- 1/2	-9.0
O	COMSHARE	2- 4	4	+ 3/4	+23.0
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	12 7/8	- 1/4	-1.9
O	INFORMATICS INC	1- 1	1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 1	1 1/4	0	0.0
O	KEANE ASSOCIATES	2- 3	3	0	0.0
O	KEYDATA CORP	2- 5	3 1/4	- 1/4	-7.1
O	LOGICON	3- 5	4	+ 1/8	+3.2
A	MANAGEMENT DATA	1- 3	2 5/8	0	0.0
A	NATIONAL CSS INC	6- 25	21 1/4	+ 3/4	+3.6
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 22	20 1/8	+1	+5.2
N	PLANNING RESEARCH	2- 6	3 3/4	- 1/2	-11.7
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	2- 5	4 1/8	+ 1/8	+3.1
O	REYNOLDS & REYNOLD	10- 24	18	- 1/2	-2.7
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1	0	0.0
O	TYMSHARE INC	7- 23	26 3/4	+ 3/8	+1.4
A	URS SYSTEMS	2- 5	4 1/8	+ 1/4	+6.4
N	WYLY CORP	2- 7	4 7/8	+ 5/8	+14.7
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 13	9 5/8	- 3/8	-3.7
O	ADVANCED MEMORY SYS	1- 10	9	0	0.0
N	AMPEX CORP	3- 9	7 5/8	- 5/8	-7.5
O	ANDERSON JACOBSON	1- 4	3	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 6	5 3/8	+ 3/4	+16.2
A	BOLT, BERANEK & NEW	5- 13	8 3/8	- 1/8	-1.4
N	BUNKER-RAMO	4- 8	6 1/2	0	0.0
A	CALCOMP	3- 7	5 1/2	0	0.0
O	CAMBRIDGE MEMORIES	1- 5	5 1/4	+1	+23.5
N	CENTRONICS DATA COMP	7- 35	27 3/4	- 7/8	-3.0
O	CODEX CORP	15- 42	37 1/2	-1	-2.5
O	COGNITRONICS	1- 2	1 1/8	- 1/8	-10.0
O	COMPUTER COMMUN.	1- 3	4 1/4	+ 1/8	+3.0
O	COMPUTER CONSOLES	3- 7	6	+ 1/2	+9.0
A	COMPUTER EQUIPMENT	1- 3	2	0	0.0
O	COMPUTER MACHINERY	1- 2	2	+ 1/4	+14.2
O	COMPUTER TRANSCEIVER	1- 2	1 5/8	0	0.0
O	COMTEN	2- 9	7 3/4	- 1/4	-3.1
N	CONRAC CORP	12- 30	23 7/8	+1 1/4	+5.5

EXCH		1975-76 RANGE (1)	CLOSE MAR 31 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	1- 3	1 3/8	0	0.0
O	DATA 100	5- 16	12	- 5/8	-4.9
A	DATA PRODUCTS CORP	2- 11	9 3/4	- 3/8	-3.7
O	DATA TECHNOLOGY	1- 3	2	- 1/8	-5.8
O	DATUM INC	1- 3	2 1/4	+ 1/8	+5.9
O	DECISION DATA COMPUT	2- 7	3	- 1/2	-14.2
O	DELTA DATA SYSTEMS	1- 1	1/4	- 1/8	-33.3
O	DI/AN CONTROLS	1- 1	1	0	0.0
N	ELECTRONIC M & M	1- 3	3	+ 1/8	+4.3
O	FABRI-TEK	1- 1	1	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1	- 1/2	-33.3
N	HAZELTINE CORP	3- 12	10 3/8	0	0.0
N	HARRIS CORP	18- 47	45 3/4	- 1/2	-1.0
A	INFOTERM CORP	3- 23	17 1/2	- 5/8	-3.4
O	INFOREX INC	2- 7	6 1/4	- 1/2	-7.4
O	INFORMATION INTL INC	3- 18	15 1/8	-1 3/8	-9.[illegible]
O	INTEL CORP	21-10[illegible]	10[illegible]	+5 1/2	+[illegible]
A	LUNDY ELECTRONICS	2- 7	5 1/8	- 1/2	-[illegible]
O	MSI DATA CORP	3- 10	7	0	0.0
A	MILGO ELECTRONIC	3- 24	17 1/8	+ 5/8	+[illegible].7
N	MOHAWK DATA SCI	1- 7	5 5/8	- 1/4	-4.2
O	OPTICAL SCANNING	1- 3	3/4	0	0.0
O	PENRIL CORP	1- 3	2 1/2	0	0.0
A	PERTEC CORP	2- 8	6 3/4	+ 3/8	+6.2
A	POTTER INSTRUMENT	2- 3	1 3/4	0	0.0
O	PRECISION INST.	1- 1	3/4	- 1/2	-40.0
O	QUANTOR CORP	2- 6	4 1/8	+ 1/8	+3.1
O	RECOGNITION EQUIP	2- 11	9 5/8	- 5/8	-6.[illegible]
N	SANDERS ASSOCIATES	3- 11	9 3/4	- 1/4	-2.5
O	SCAN DATA	1- 4	2 3/4	- 1/8	-4.3
O	STORAGE TECHNOLOGY	6- 17	11 1/2	- 3/8	-3.1
O	T BAR INC	3- 1[illegible]	6 3/4	- 1/2	-6.8
O	TALLY CORP.	1- 6	5 1/8	0	0.0
O	TEC INC	1- 5	4 3/4	- 1/4	-5.0
N	TEKTRONIX INC	13- 60	60	+ 1/2	+0.8
N	TELEX	1- 5	4 1/4	+ 1/2	+13.3
O	WANGCO INC	4- 20	20	+ 7/8	+4.5
O	WILTEK INC	1- 4	2	0	0.0
	SUPPLIES & ACCESSORIES				
[illegible]	ADVANCED SYSTEMS INC	1- 3	3 1/4	+ [illegible]	+[illegible]
[illegible]	BALTIMORE BUS FORMS	4- 5	4 [illegible]/4	+ 1 [illegible]	+5.5
A	BARRY WRIGHT	5- 9	8 3/4	- 1/4	-2.7
O	CYBERMATICS INC	0- 1	5/[illegible]	- 1/8	-1[illegible]
A	DATA DOCUMENTS	[illegible]9- 4[illegible]	[illegible] 7/8	- 7/8	[illegible]
O	DUPLEX PRODUCTS INC	12- 25	1[illegible] 1/2	+ [illegible]	+[illegible]
N	ENNIS BUS. FORM	5- [illegible]	[illegible]	- 1/8	-1.[illegible]
[illegible]	GRAHAM MAGNETICS	5- 1[illegible]	[illegible] 3/4	+ 3/4	+7.5
O	GRAPHIC CONTROLS	[illegible]- 21	17 1/2	+1	+[illegible].0
N	3M COMPANY	[illegible]3- [illegible]	6[illegible] [illegible]	+ 7/8	+1.3
O	MOORE CORP LTD	39- 51	48 1/[illegible]	+ 1/4	+0.5
N	NASHUA CORP	[illegible]	[illegible] 1/4	- 5/[illegible]	-4.5
O	STANDARD REGISTER	11- [illegible]	1[illegible] 1/4	- 1/2	-2.6
O	TAB PRODUCTS CO	4- 8	6 1/2	- 1/4	-3.7
N	UARCO	17- 25	2[illegible] [illegible]/8	+ 1/8	+[illegible].5
O	VANIER GRAPHICS CORP	4- 8	7 3/4	- 1/8	-1.[illegible]
A	WABASH MAGNETICS	3- 8	7	0	0.0
N	WALLACE BUS FORMS	15- 25	21 7/8	- 1/2	-2.2

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